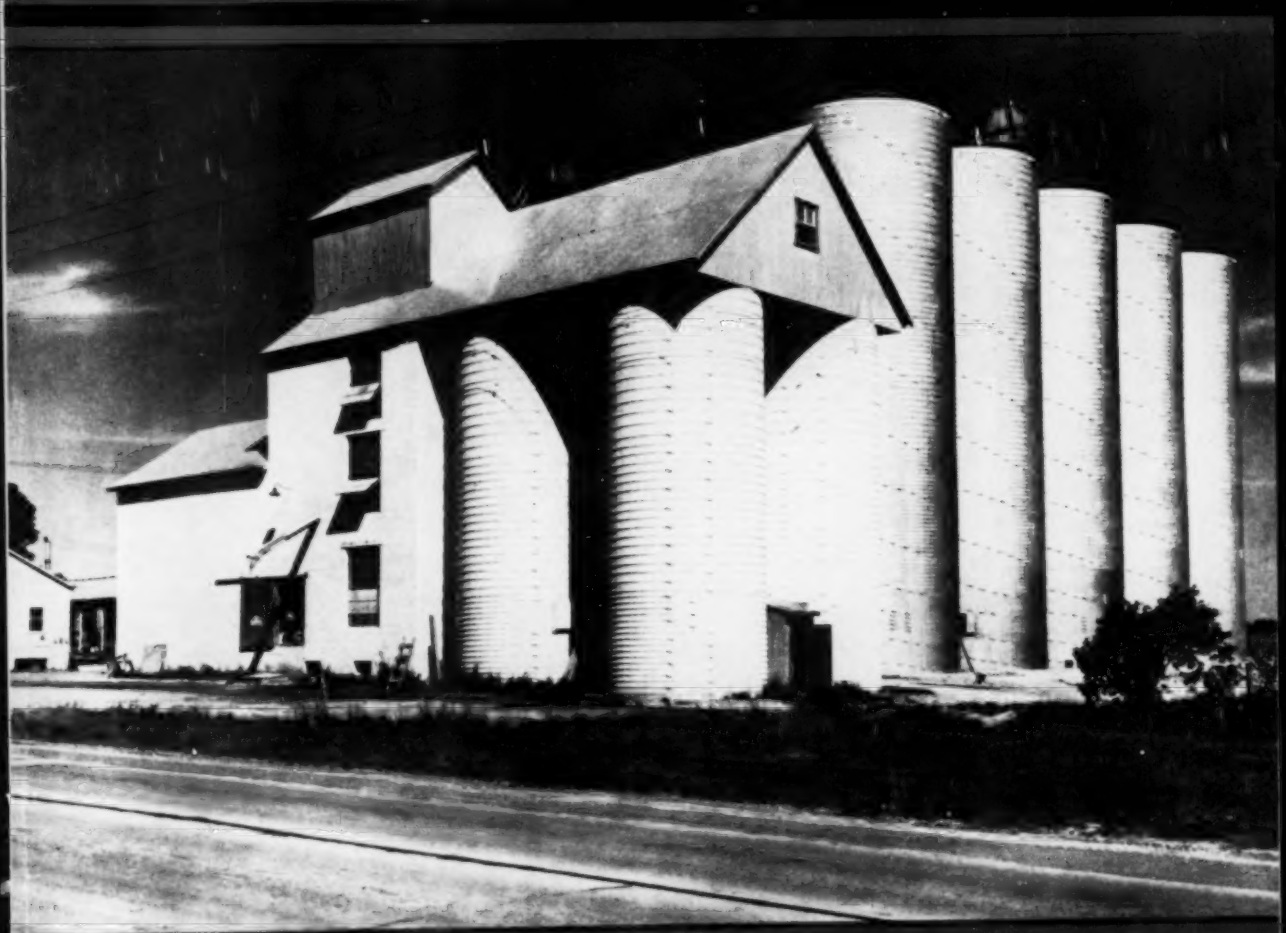
Vol. VI, No 11 NOVEMBER, 1951

AGRICULTURAL CHEMICALS



In This Issue:

State Fertilizer Laws Summarized • Choosing Emulsifiable Solutions for Insecticides • Entomologists & Phytopaths Meet Jointly • West Coast Aerial Applicators at Yakima • Safe Handling of Ammonia Solutions • Eastern Branch AAES Meets • Ithaca Meeting Held

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DDT TECHNICAL GRADE—Minimum setting point 89° C. Meets Federal Specification O-D-370.

JP50—50% DDT dust base for dust blenders. Air milled to micron-size particles. Good flowability.

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acres of richer, more profitable grazing land is the ultimate target of the National Grassland Farming Program.

To achieve the goal calls for the energetic cooperation of the entire fertilizer industry.

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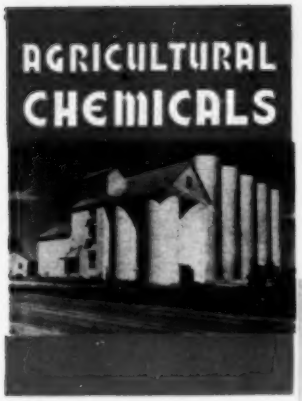

THIS MONTH'S COVER:

Modern storage system recently completed for J. E. Churchman & Sons, Clayton, Delaware, for storage of fertilizers. The tanks are constructed of "Air-Cell" concrete staves four inches thick, resistant to fire, acid, and freezing. (Photo by Marietta Concrete Corp., Marietta, Ohio.)

VOL. VI No. 11
NOVEMBER 1951

A Monthly Magazine For the Trade

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AGRICULTURAL CHEMICALS

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Entered as second-class matter November 4, 1949, at the Post Office at Baltimore, Md., under the Act of March 3, 1879.

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2,4-D Weed Killer, Liquid Amine Concentrate
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Aldrin Products
Aldrin Emulsifiable Concentrates 25%
Aldrin Oil Concentrate
Aldrin Dust Concentrate

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Toxaphene Dust
Wettable Toxaphene Powders

Dieldrin Products
Dieldrin Emulsifiable Concentrates
Dieldrin Concentrate Dusts

Cotton Dusts
Cotton Dusts (In all combinations—Technical Toxaphene, BHC, DDT, Sulphur, Aldrin and Dieldrin)

Liquid Cotton Sprays
Cotton Sprays (In all combinations—Aldrin, DDT, Dieldrin, and Sulphur)

DDT Dusts
DDT Emulsion Concentrate
DDT Wettable Powder
DDT Dust Concentrate
DDT Dust
Potato Dusts

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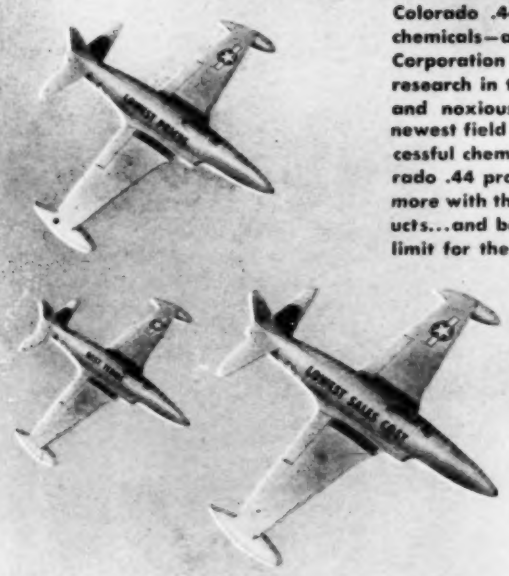

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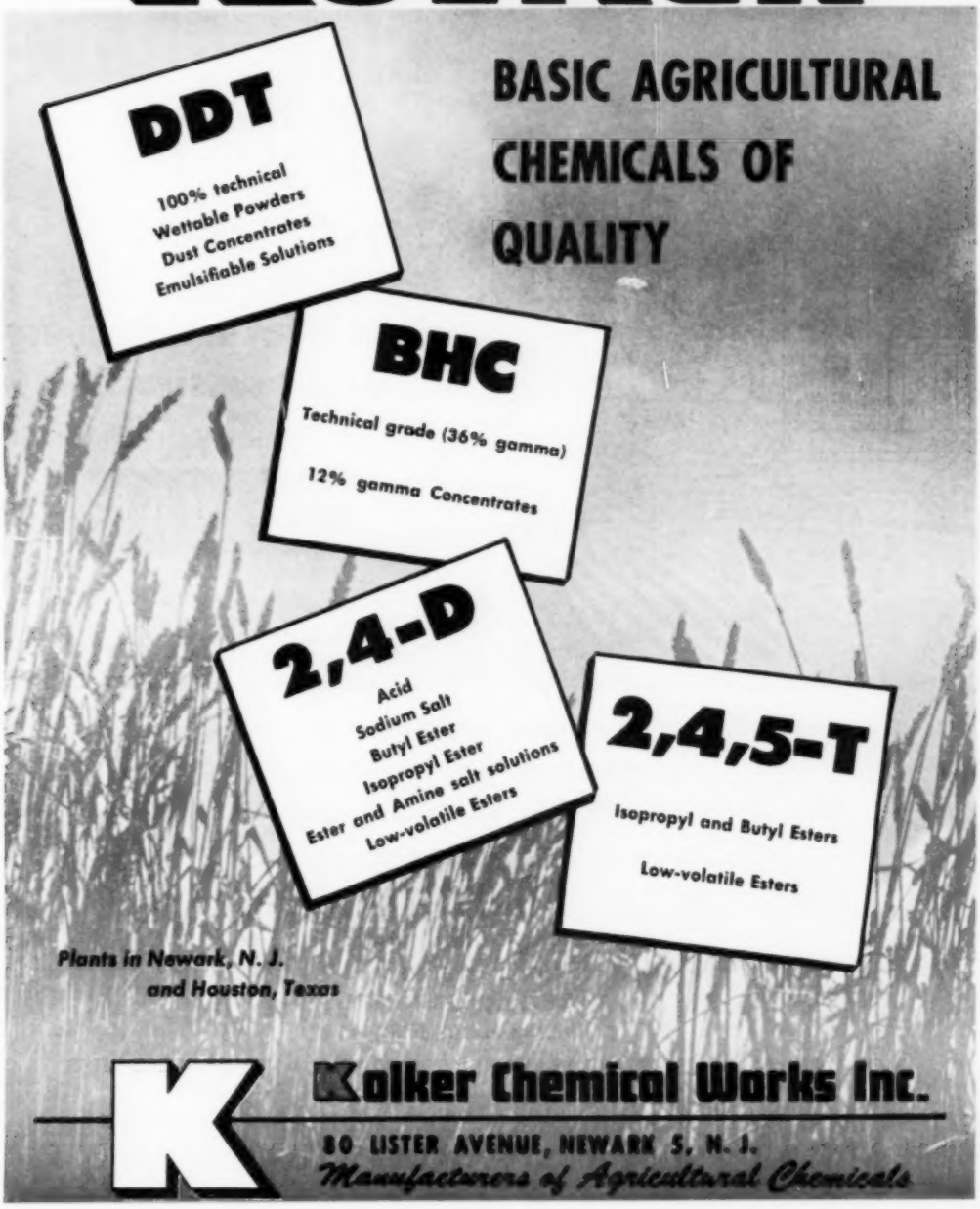
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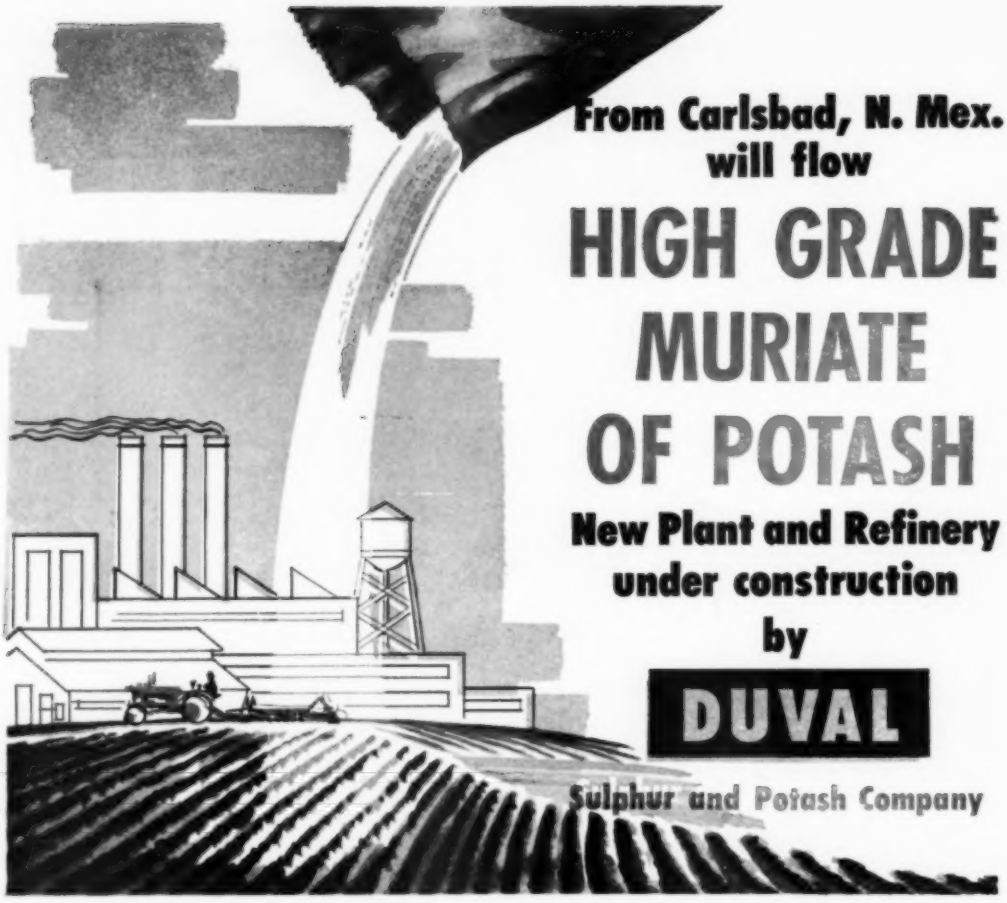

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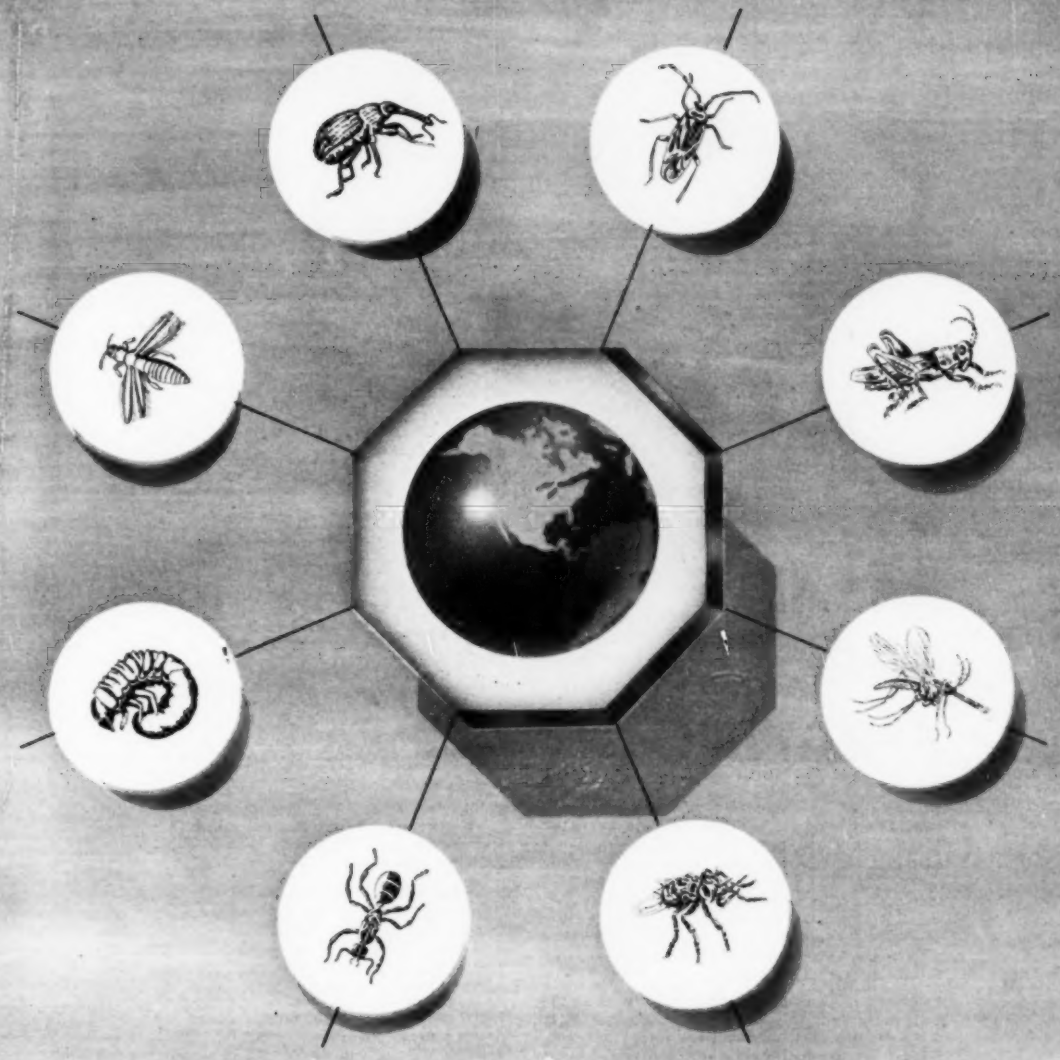

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Cut stumps are sprayed to prevent resprouting.

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Esteron Brush Killer and Esteron 245 are developments of Dow's research work with leading utilities and service organizations. Complete information is available upon request.

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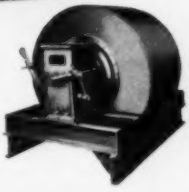

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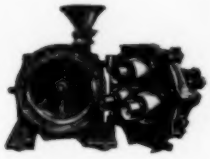

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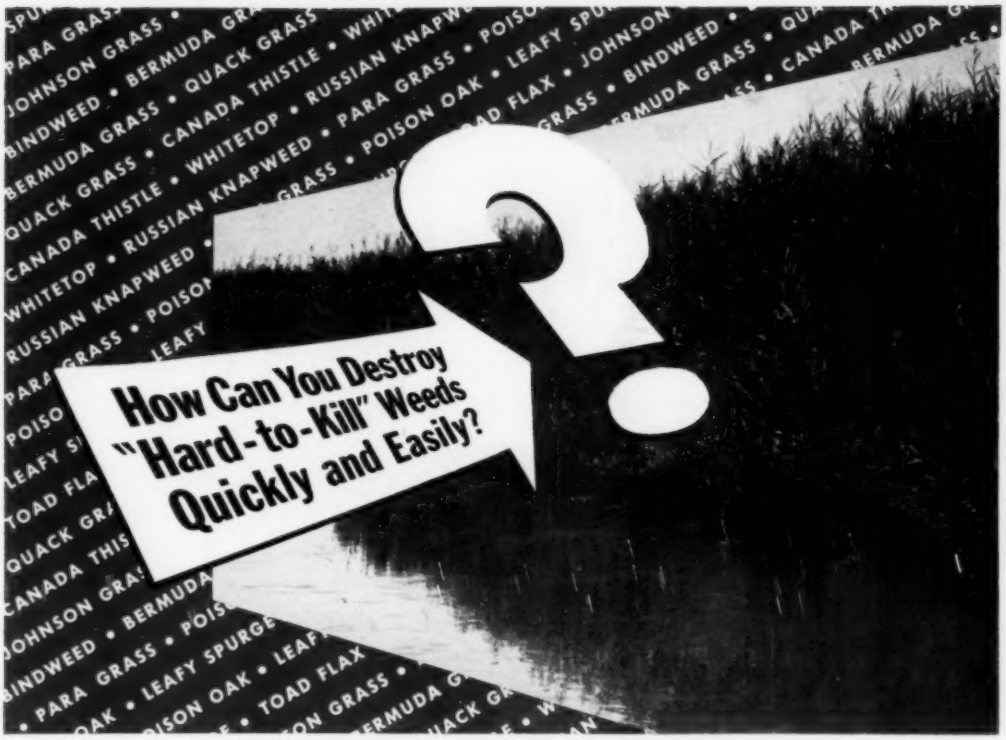

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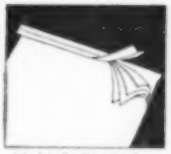

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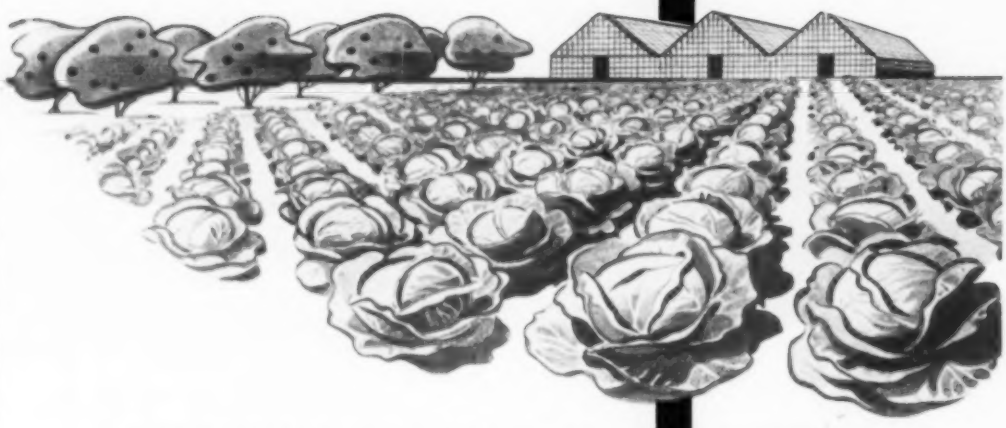
Nifos-T vanquishes ...then vanishes



Properly formulated and correctly applied Monsanto Nifos-T (TEPP) destroys mites, aphids, thrips and dozens of other enemies of plant life. Since its toxicity rapidly disappears after it is applied, Nifos-T can be used safely on edible plants shortly before harvest.

Monsanto Nifos-T (tetraethyl pyrophosphate, technical) is manufactured for use on crops of the field, garden, greenhouse or orchard. Toxicity is such that it is not a chemical for use against pests in the household, in farm buildings or on animals.

While Nifos-T is one of the most toxic agricultural chemicals, reasonable precautions make it perfectly safe to handle. Nifos-T is economical whether used in formulations for sprays, aerosols or dusts. It is harmless to most plants when properly used.

Since chemical raw materials are short, Nifos-T may be hard-to-get during the months ahead. We suggest you establish your source of supply without delay. For information on Nifos-T, or other Monsanto insecticidal or herbicidal chemicals, contact the nearest Monsanto Sales Office or MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

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2,4,5-T ISOPROPYL ESTER
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SANTOCHLOR® (para-Dichlorobenzene)
SANTOPHEN 20 (Pentachlorophenol, Tech.)
TRICHLOROBENZENE, Technical
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NIRAN® (Parathion. For agricultural use only)

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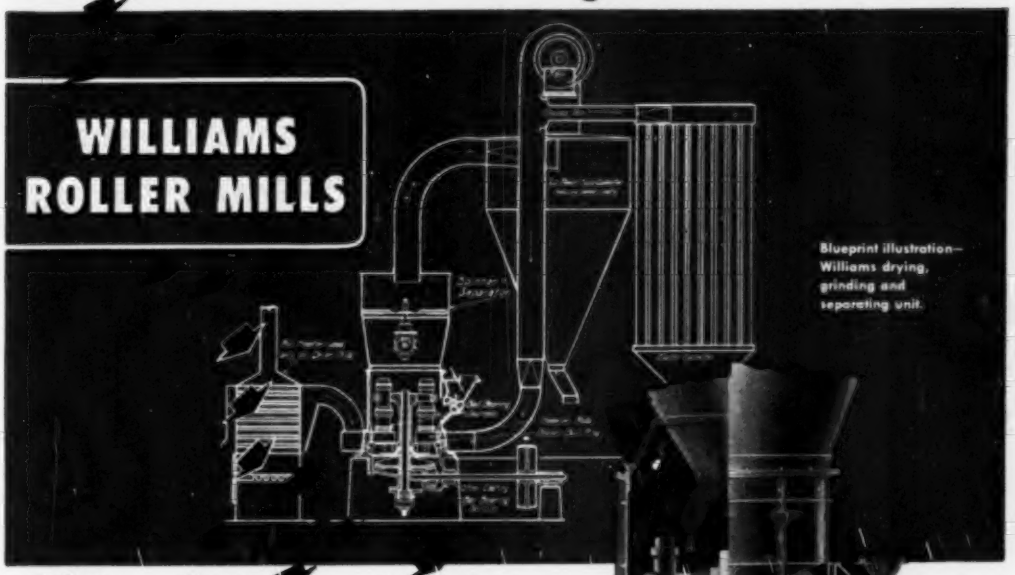
For those Fine Grinding Jobs . . .

WILLIAMS ROLLER MILLS



Blueprint illustration—Williams drying, grinding and separating unit.

200 to 325 mesh Grinding

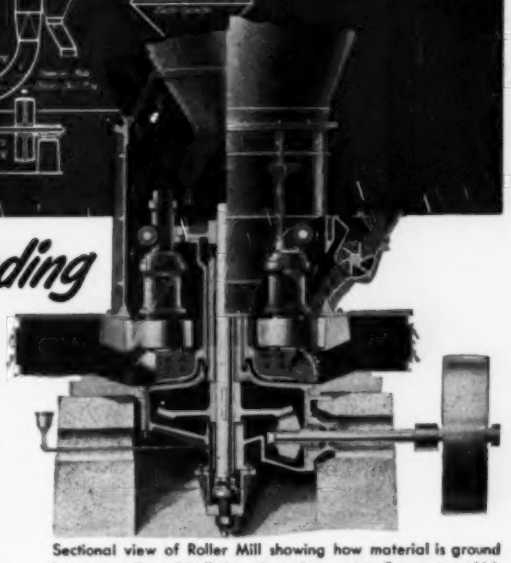
Fine grinding of insecticide powders can ONLY be done economically with PROPER fine grinding equipment and we believe the Williams Roller Mill with Air Separation is the finest mechanical method of material reduction on the market today.

Experienced, engineering know-how, embodied in the design of the unit permits the production of high concentrations of DDT, BHC, Toxaphene, etc., — thoroughly blended. Also pulverizes Pyrethrum, Rotenone, Sulphur for Dusting and Gypsum, Limestone, Rock Phosphate and similar products on an around-the-clock schedule.

Control of product size is assured with the Spinner Air Separator. Finenesses of 98% and 99.9%, 325 mesh are obtainable and can be consistently maintained. A clean, dustless installation from feed opening to finishing product bin, all automatically handled, makes this unit additionally desirable for your plant.

Williams Roller Mills are available in a full range of sizes.

WC-51-1



Sectional view of Roller Mill showing how material is ground between rolls and bull ring, then air swept to Separator which extracts fines and returns oversize for re-grinding.

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Heavy Duty Hammer Mills for crushing and grinding rock phosphate, gypsum, limestone . . . also for disintegrating ammonium sulphate lumps and fertilizer mixes that "set-up" in storage. The Helix-Seal Pulverizer for disintegrating and blending insecticide mixes and concentrations ready for use.

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CRUSHERS GRINDERS SHREDDERS

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Homer praised "pest-averting sulphur...

. . . the divine and purifying fumigation" to his fellow Greeks one day in 1,000 B.C. when they called on him to save their crops from insect hordes threatening the country's food supply.

Actually, of course, Homer's recommendation, though somewhat too comprehensive, was basically sound. In fact, compared to some of the pest control advice offered by the sages of succeeding centuries his knowledge of pesticides placed him well before his time.

But the old boy would be humble indeed were he to drop in on the world today and see the agricultural chemical industry in action. He'd stand amazed before a highly specialized science created by such organizations as Geigy Company, Inc. whose compositions are exact formulations with specific applications for practically every type of insect and disease infestation.

Therefore, whatever your requirements remember that Geigy Company, Inc. represents the highest standards of quality, dependability and service.

Aldrin	Chlordane	Fumigants	Pentachlorophenol	Toxaphene
Arsenicals	Copper	Lindane	Purified DDT	2,4-D & 2,4,5-T
BHC	DDT	Methoxychlor	Rotenone	Specialty products
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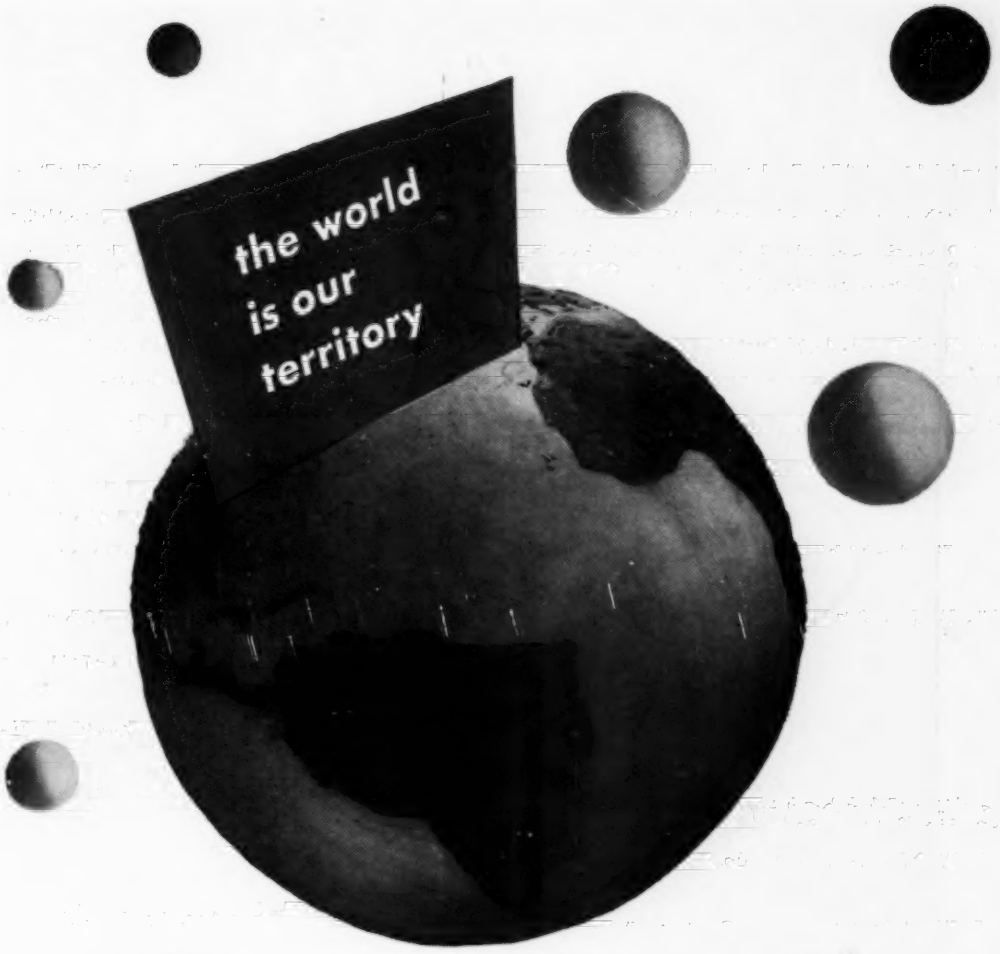

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The Safety Package for Hard-to-Control Products...

Fulton W.P.P.L. (Waterproof Paper Lined) Bags are made with a tough paper or plastic lining laminated to cotton or burlap. The most finely powdered product cannot sift through this lining, which is also an efficient vapor and moisture barrier.

Fulton W.P.P.L. Bags are designed especially for sensitive products that are affected by evaporation, changing atmospheric conditions, or that need protection against moisture or odors.

Our modern plant in New Orleans is turning out famous Fulton MULTIWALLS in larger and larger quantities. Complete satisfaction and highest praise from industry's largest users, have made Fulton Multiwalls more popular than ever before. Fulton makes the MULTIWALL Bag for your product — all types and sizes.

Over rigid containers they have the advantage of *flexibility* which contributes to easier handling and better utilization of storage space. There are also important savings in initial cost and freight. Address your nearest Fulton branch for further information on this safety package for your product.

Fulton BAG & COTTON MILLS

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more Promotion in '52 for your Pyrenone Insecticides

U.S.I.

1952 Pyrenone promotion will be the biggest yet – a promotional and educational effort which will be a foundation on which manufacturers and distributors of Pyrenone-based products can build increased sales. Exploit this promotion to your advantage – put Pyrenone *in your product* – put Pyrenone *on your label!*

Here are the highlights of the program:

PUBLIC HEALTH OFFICIALS, SCIENTISTS and SANITATION SPECIALISTS in the food industry and allied fields will see ads describing the advantages of Pyrenone for insect control all along the food production line. These ads will appear in *Journal of Milk and Food Technology* and *Modern Sanitation*.

COUNTY AGENTS, EXTENSION AND OTHER AGRICULTURAL LEADERS will learn about the applications and advantages of Pyrenone through *County Agents Directory, Agricultural Leaders' Digest* and *Better Farming Methods*.

BUYERS AND DISTRIBUTORS OF MILK will read about the advantages of using Pyrenone for fly control in the production and distribution of clean milk from farm to finished product in *Milk Dealer* magazine.

300,000 LEADING DAIRYMEN across the nation will be covered in the Pyrenone ads in *Hoard's Dairyman*.

IN ADDITION, *Pyrenone Bulletin* newsletters will be mailed to many of the groups mentioned above, and other direct-by-mail educational articles and reprints will be distributed to those who influence the sale and use of insecticides.

All together, the 1952 promotion program means *greater acceptance* for your insecticides which are formulated with Pyrenone. Make your plans now for your greatest year.

Pyrenone*

*Reg. U.S. Pat. Off.

U.S. INDUSTRIAL CHEMICALS CO.

Division of National Distillers Products Corporation

60 East 42nd Street, New York 17, N. Y.

*Pyrenone is a registered trademark of National Distillers Products Corporation.

YOUR dry dust concentrate will give top field performance—even though dense let-down agents have been added—when you use Celite.

You'll find that the presence of a small percentage of Celite—because of its great bulk per unit of weight, and the irregular shape of the individual particles—fluffs up the final dust and helps neutralize the effect of heavy extenders. Better dispersion in the field is thereby assured . . . at very little cost.

Celite offers other advantages, too:

As a Grinding Aid: Celite aids in grinding of both solid and semi-solid low melting point poisons and makes a more potent dry dust concentrate.

As an Absorption Medium: Celite's high liquid absorption capacity allows a higher percentage of liquid poison to be absorbed while still maintaining a "dry" dust. This gives you a highly concentrated product, and lower packaging and shipping costs.

The use of Celite as a diluent and grinding aid can well be a profitable one for your operation. For additional information, write to Johns-Manville, Box 290, New York 16, N. Y.

Properties of CELITE

FINENESS: Approximately 100% through 325 mesh
DENSITY (Vibrated): 11 pounds per cubic foot
BULK: Celite bulks much higher than most diluents
ABSORPTION: 200% of its weight of water
500% of its weight of kerosene
pH VALUE: Below 7.0
INERTNESS: Compatible with insecticide and fungicide poisons
SUSPENSION: Excellent in both air and water
COMPOSITION: Celite is amorphous diatomaceous silica (SiO_2)

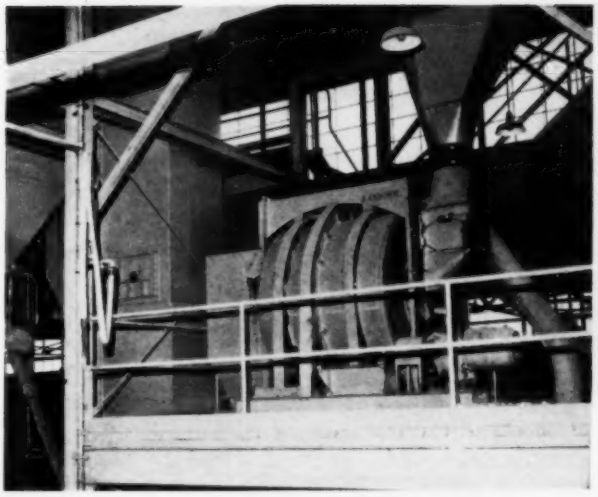
Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

Johns-Manville CELITE

JOHNS MANVILLE JM PRODUCTS

DILUENTS AND GRINDING AIDS

Keeps Production Steady



Big fertilizer company prefers dust-proof, fume-proof, simple construction of

WORTHINGTON *Ransome* MIXER

Dust can't interfere with efficiency and profits with this big fertilizer mixer on the job.

Construction is dust-proof, fume-proof.

Other features: air-operated control for charging and discharging (valve operated by hand or by solenoid and remote push-button) . . . automatic vibrating hammers to prevent "building up" inside drum . . . large clean-out manholes.

Standard sizes—½, 1, 2 tons. Pulley or direct electric motor drive with fully-enclosed, fan-cooled motor.

Write for bulletin on Worthington-Ransome Mixers, built from designs developed from nearly a century of mixer experience. And remember *other* Worthington products for the fertilizer industry—acid pumps, air compressors, air spades, etc. *Worthington Pump and Machinery Corporation, Ransome Industrial Mixer Division, Dunellen, New Jersey.*

THIS IS THE FAMOUS RANSOME MIXING ACTION

1. As charge enters, it is scattered over the bottom. (Drum revolves toward you in picture.)

2. Mixture then goes up sides, falls in two fanlike formations, is carried up again—operation repeated.

3. When mixed, material is discharged, leaving drum completely clean of all, including finest, material.

WORTHINGTON

YR.1.3

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CAL-NITRO
TRADE MARK REG. U.S. PAT. OFF.

The Perfect Topdresser

CAL-NITRO*—with a guaranteed nitrogen content of 20.5%—supplies the nitrogen that crops need at *low cost*. It has half nitrate nitrogen and half ammonia nitrogen—both forms *quick-acting*, and the ammonia form *long-lasting*.

Cal-Nitro also contains the equivalent of about 9% Calcium Oxide and 7% Magnesium Oxide—essential to vigorous growth.

The soil reaction of Cal-Nitro is neutral. It does not increase or decrease soil acidity or measurably change pH values.

In free-flowing pellet form, Cal-Nitro "rattles off the leaves", reducing foliage burn to a minimum, and is easy to apply by hand or machine.

*The Synthetic Nitrogen Products Corporation owns the trademark "Cal-Nitro", which is used to designate a nitrogen fertilizer compound.

SYNTHETIC NITROGEN PRODUCTS CORPORATION, 285 MADISON AVENUE, NEW YORK 17

THE EDITOR COMMENTS

THAT the fertilizer industry will back an over-all safety program was indicated in Chicago last month by the enthusiasm with which industry representatives participated in the first fertilizer session ever held as part of the National Safety Congress.

The Safety Council scheduled the fertilizer group for a small dining room seating about 45. But at meeting time a crowd of more than 200 was on hand, causing congress officials to scurry around for larger quarters.

The subject of safety in fertilizer plants is of more than academic interest. Savings of many thousands of dollars each year in insurance premiums are possible when a demonstrable reduction in accident rates has been achieved. Davison Chemical Corp., a leader in safety promotion, has reported refunds of some $75,000 in insurance costs due directly to its safety record in plants around the country, and other companies are also in line for similar bonuses in this regard.

Compensation rates are made on a state-wide basis, as a rule. And in most states, the majority of plants are smaller units which in many cases have not been operating under an active safety program. Thus even a few accidents in a given state can keep compensation rates at a higher level than would be justified with 100% participation.

Speakers at the Chicago meeting pointed the way toward reducing accidents in fertilizer plants. The constant use of safety goggles, masks, gloves, aprons and even headwear was strongly urged by several speakers, as was the installation of dust-arresting equipment to keep toxic fumes at a minimum. The equipment for increasing personal safety among fertilizer workers is already on the market, and the financial outlay for such is not large in most cases.

Aside from the benefits derived from lower insurance rates, an effective safety program has other favorable factors, too. Whereas the industry for years was able to attract only the lowest grade of laborers to work in dust-filled plants with pick and shovel, today's mechanization, shorter hours and more steady employment have corrected this condition considerably. It was the opinion of many at the Chicago meeting that this factor can be corrected further if an honest effort is made to reduce the work hazards formerly associated with the fertilizer industry.

We are glad to see this awakening on the part of top management in the fertilizer manufacturing field. It is certainly in keeping with other technicological advances which have brought American fertilizer production to nearly 20 million tons a year.

OF some 350 recent seizures and criminal action cases reported by the Federal Food and Drug Administration in its *Notices of Judgment*, not a single case on spray residue is included: The report covered most of 1951; from February through September, inclusive, a time when the presence of any toxic residue from pesticides would have aroused more than mild interest in the minds of both the public and FDA investigators.

Instead of finding residues of insecticides, it is reported that 260 cases (49%) were based on, or include, a charge of adulteration in that the products consisted wholly or in part of "a filthy substance," or "of filthy substances," including one or more of the following: insects, insect parts, insect excreta, larvae, maggots, worms, mites, beetles, rat excreta, rodent hair and rodent urine.

In view of this official report, it looks like Rep. Delaney might rewrite his essay, "Peril on your Food Shelf" from a slightly different angle . . . that there is need for wider use of pesticides to protect the nation's food supply from insect and rodent contamination. Not that we expect Mr. Delaney to do this, but the FDA report should give pause to his committee in Washington and perhaps allow its members to see at least a little advantage in the use of pesticides in keeping the food supply clean!

All Purpose Unit for { INSECTICIDE GRINDING and BLENDING

RAYMOND ROLLER MILL

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MAINTAINS UNIFORMITY OF FINISHED MATERIAL

Get more information about this versatile mill. Write for Bulletin No. 68.

The Raymond High Side Roller Mill is a versatile, all-purpose unit for grinding and intimately blending concentrates, field strength formulations, sulphur and sulphur bearing insecticides. Concentrates can easily be produced at finenesses as high as 99% or better passing 325 mesh. Field strength products can be made at unusually high capacities directly from technical grade insecticides.

Whizzer classification provides a wide range of control for meeting today's exacting specifications, and changes in fineness for making different grades are performed by one simple adjustment without stopping the mill. Uniformity of finished formulation is very high. Clean, dust-free operation and practically continuous operation without shut-down for cleaning are additional Raymond advantages that contribute to quality and economy of production.

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Summary of Fee and Labeling Provisions in the Control of Fertilizers at State Level

State Fertilizer Controls

by
John D. Conner*
Washington, D. C.

FEW industries are subjected to more extensive and labyrinthian state legislative controls than is the fertilizer industry. Each of the forty-eight states has a comprehensive law regulating the sale and distribution of commercial fertilizers. The majority of these laws have a long legislative ancestry, tracing back in some instances to beyond the turn of the century. Like Topsy, these laws have "just grown" and are still growing. During the 1951 legislative season alone, ten of the thirty-four state legislatures in session enacted or amended fertilizer laws.

There is no federal counterpart to these state laws. However, S. 1693, a bill to regulate at the federal level the registration, manufacture, labeling, and inspection of fertilizer and fertilizer materials shipped in interstate commerce, was introduced in the First Session of the Eighty-second Congress and is now pending in the Senate Committee on Agriculture and Forestry. It is expected, however, that Congress will recognize the predominating local aspects of fertilizer control as it has in the past and that it will not superimpose upon this local authority an additional control at the federal level. The impropriety of federal legislation in this field has been forcefully brought out during the course of the hearings before the House Select Committee to Investigate the Use of Chemicals in Food Products.

The backbone of all state fertilizer laws is the requirement that before a particular brand of fertilizer can be offered for sale, sold, or distributed, it must be registered with the appropriate fertilizer control official. The basic purpose of registration is to prevent inefficacious, fraudulent, or unsafe fertilizers from being marketed. It is essentially a tool of enforcement. Each application for registration is carefully examined as to materials used and guaranteed analyses, and if the proposed brand offered for registration does not comply with the requirements of the law, registration may generally be re-

*** Mr. Conner is a member of the Bar of the District of Columbia. His work as counsel for several leading trade groups over the period of the past several years, has given him extensive experience with the various public laws under which the chemical industry is regulated. Mr. Conner has analyzed the fertilizer laws of each of the forty-eight states, as they were amended through the 1951 sessions of the legislatures, and in this article he summarizes the provisions of each law relating to the registration, payment of fees and labeling of fertilizers.—Ed.**

fused. The particular data which must accompany the application for registration vary from state to state, as do the times when registration must be made or renewed. In most states, fertilizers shipped to factories for manufacturing purposes are exempt from the registration provisions.

Informative and adequate labeling to provide guidance and protection for farmers looms as the most salient substantive feature of state fertilizer laws. All of these laws require as a condition precedent to registration or sale that every fertilizer sold or distributed in the state must be labeled on the package or on an attached tag with the guaranteed or chemical analysis and a statement showing the weight in pounds, the brand-name or trademark, and the name and address of the manufacturer.

The form in which the chemical or guaranteed analysis must be stated varies from state to state. Generally, the minimum percentages of the primary plant foods contained in or claimed for a particular brand of fertilizer and, in some cases, the secondary and minor plant foods must be shown on the label. There is substantial variation from the norm in the form in which phosphoric acid must be stated, the order of stating the analysis, requirements for a statement of plant food sources and the naming of inert carriers.

Many states also require a statement as to the residual effect of the fertilizer upon the soil. In most states only the items specified in the law may be stated on labels unless permission is obtained from the appropriate fertilizer control official. Regionally, the southern states prescribe the most detailed and stringent labeling requirements.

Generally, the taxes imposed under the fertilizer laws fall into the category of either registration or inspection fees. All but seven states require the payment of a registration or license fee for each brand or grade of fertilizer registered and sold. Usually, this fee must be paid at the time of registration and renewed annually thereafter. The fees charged by the various states vary from 50¢ to $50.00 per brand. Under most laws, if the manufacturer, importer or shipper pays the registration fee, an agent or subsequent seller is exempt from the registration fee provision.

The second typical tax device, inspection or analysis fees, is employed in all but eight states. In most cases, this type of fee is imposed in addition to the regular registration fee. Generally, the fees are based on tonnage reports which must be submitted to the appropriate control official at specified monthly, quarterly, semi-annual, or annual periods, or on tax stamps or tags which must be purchased and attached to the container. There has been a perceptible tendency in recent years to shift to the first alternative method with the result that these tonnage reports are gradually superseding tax tags and stamps as the media for determining and assessing fees. Inspection fees range from 1¢ per ton to 50¢ per ton, with the lowest average level in the Middle Atlantic and New England states and the highest average level in the South.

The provisions relating to the scope, labeling and tax and fee provisions of each of the state laws are summarized below.

In addition to these provisions, these state laws contain myriad provisions relating to adulteration, establishment of minimum grades and enforcement provisions which it has not been possible to summarize in this article because of space limitations.

The majority of the state laws contain a prescription of adulterated products, either adulteration resulting because of the likelihood of the product causing injury to growing crops, or economic adulteration.

Many of the state laws establish minimum plant food guarantees and limit the grades of fertilizer which may be sold. The latter is usually implemented by administrative regulations. The statutory establishment of minimum plant food guarantees is especially prevalent in the southern states.

Enforcement of state fertilizer control laws usually is effectuated initially through the registration procedure. It normally is followed up by continuous sampling by state inspectors of fertilizer on the market. The provisions of the various laws relating to analysis and sampling are usually quite detailed.

The typical catalogue of enforcement tools includes denial or cancellation of registration, stop-sale orders, seizure and condemnation, and penal prosecution. In some states, the injunctory power is available to the state. Statutory sanctions include the assessment of penalties for plant food deficiencies, fines for non-compliance with the misbranding, adulteration or other provisions of the law, and refunds to the purchaser.

The fertilizer industry has given the utmost cooperation to the fertilizer control officials in complying with the maze of fertilizer control laws, and, fortunately, this has considerably minimized enforcement problems.

The foregoing is but a brief summary of the contours of state fertilizer laws. It assumes all the risks of over-simplification of a complex subject. Any objective appraisal of these laws must, in our opinion, reflect the pressing need for a greater degree of uniformity in the various state laws, particularly in the registration, labeling and fee provisions. The writer previously voiced in another forum* the imperative need for greater uniformity in the various state laws controlling the sale and distribution of food, drugs, and pesticides. In our opinion, this summary demonstrates the need and opportunity for greater uniformity in this field.

A uniform pattern of controlling the sale and distribution of fertilizers in the various states could and should be made sufficiently flexible to be compatible with varying local condition and requirements, a requirement which could not be achieved by the passage of federal legislation. Steps are now being

* "A National Labeling Pattern" - *Food Drug Cosmetic Law Journal*, January, 1951.

taken in the direction of uniform fertilizer laws. The need for such uniformity is apparent.

The summary below covers the scope, fee provisions, and labeling provisions of the commercial fertilizer statutes in force in each of the forty-eight states, including the 1951 amendments. It must be realized that such a limited undertaking can reflect only a caricature of the complete picture. The summary is at best a barometer of the actual situation in the fertilizer control field and should not supplement recourse to the more specific and detailed texts of the laws or to the implementing administrative regulations.

In addition to provisions listed here, many state laws contain many other provisions relating to adulteration, establishment of minimum grades and enforcement. Provisions relating to scope, labeling, tax and fees in each state included in article

New England States

Connecticut[1]

Scope: Commercial fertilizers are defined in the law to include any substance imported, manufactured, prepared or sold for fertilizing or manuring or soil amendment purposes. Cottonseed meal, rapeseed meal, castor pomace and all other vegetable products used as fertilizer, including the ashes of cotton hulls and wood ashes, are expressly included. Exemptions include marl, lime, barnyard and stable manure which have not been artificially treated or manipulated.

Registration Fees: An analysis fee of $10.00 must be paid for each primary plant food contained or claimed to exist in a fertilizer submitted for registration. The fee must be paid at the time of registration and on January 1 of each year.

Tonnage Reports and Fees: In addition to the registration or analysis fee, an inspection fee is imposed at the rate of 6¢ per ton. This fee is based on semi-annual tonnage reports submitted on January 1 and July 1.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the guaranteed analysis. The analysis must state in percentages the available and total phosphoric acid, nitrogen, equivalent ammonia, and potash soluble in water.

In the case of bone meal, tankage, and other organic products, the total phosphoric acid may be stated in lieu of available phosphoric acid.

Maine[2]

Scope: Commercial fertilizers are defined in the law to include all materials used for fertilizing purposes except unprocessed animal manure. Lime, marl, or wood-ashes are classed as commercial fertilizers.

Registration Fees: The registration fee varies according to the primary plant food contained in the fertilizer registered. The fee is $14.00 each for nitrogen and phosphoric acid, and $7.00 each for potash and magnesium. The fee must be paid by January 1 of each year.

Tonnage Reports and Fees: In addition, an inspection fee of 1¢ per ton is required. This fee is based on annual tonnage reports filed with the state tax assessor on September 1.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the chemical analysis. The analysis must state the minimum percentages of nitrogen available as plant food (present as nitrates, ammonium salts or organic nitrogen), potash soluble in water, available phosphoric acid, magnesium soluble in water, and/or total magnesium.

If claims are made for the presence of any secondary or minor plant food, the label must state the amount of such plant food expressed as the element, in both minimum and maximum percentages, and the major fertilizing material (s) used to supply the element.

If the product contains plant foods or other compounds which may cause injury to plant growth unless special precautions are taken, these precautions must also be stated.

Massachusetts[3]

Scope: The law applies to commercial fertilizers, but does not define the term.

Registration Fees: The registration fee is $8.00 for each primary plant food, $8.00 for magnesium oxide when guaranteed, and $12.00 for each brand of agricultural lime and gypsum, except gas house lime. The fee must be paid by January 1 of each year.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 6¢ per ton. The fee is based on semi-annual tonnage reports submitted in January and July. Reports and inspection fees are not required in the case of agricultural lime and gypsum.

Labeling Requirements: The law requires, in addition to statements on the package as to weight, brand, and maker, a statement of the chemical analysis. The analysis must show in round numbers and in the prescribed order the minimum percentages of nitrogen, available phosphoric acid, and potash soluble in distilled water.

The minimum percentage of total phosphoric acid may be stated in place of the percentage of available phosphoric acid in the case of undissolved bone and untreated phosphate rock.

In the case of agricultural lime, the label must state the minimum and maximum percentages of total calcium oxide and total magnesium oxide, and the minimum percentages of calcium oxide and magnesium oxide combined as carbonates.

In the case of gypsum or land plaster, the minimum percentage of calcium oxide and of calcium sulphate must be stated.

New Hampshire[4]

Scope: The law applies to commercial fertilizers, but does not define the term.

Registration Fees: The analysis fee varies according to the primary plant food contained in the fertilizer registered. The fee is $10.00 for the phosphoric acid, $5.00 for the nitrogen, and $5.00 for the potash contained or claimed to be in the brand. However, the maximum fee for any brand is $15.00. The fee must be paid in March of each year.

Tonnage Reports and Fees: Tonnage reports and tonnage fees are not required.

Labeling Requirements: In addition to the usual label requirements as to weight, brand, and maker, the law requires a label statement of the chemical analysis showing in whole numbers the minimum percentages of nitrogen, water soluble potash, and available phosphoric acid.

Rhode Island[5]

Scope: The law applies to every lot or parcel of commercial fertilizer, or material used for manurial purposes, with the exception of the dung of poultry and domestic animals in its usual condition.

Registration Fees: An analysis fee of $8.00 is required for each of the fertilizing ingredients contained or claimed to exist in a product registered. The fee is payable annually before April 1.

Tonnage Reports and Fees: Tonnage reports and tonnage fees are not required.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show a chemical analysis stating the percentage of nitrogen, potash soluble in distilled water, and soluble, reverted, and insoluble phosphoric acid.

In the case of wood ashes and gypsum, the percentage of lime must be shown; and, in the case of lime-kiln ashes, ground limestone, slaked lime, and burned lime used for agricultural purposes, the percentages of lime and magnesia must be shown.

Vermont[6]

Scope: The law defines commercial fertilizers to include every natural or artificial

manurial substance containing nitrogen, phosphoric acid, potash, or lime. Stable manure in its original condition is excluded.

Registration Fees: An annual license fee of $20.00 is required for each brand which contains more than one of the primary plant foods, $8.00 for each brand containing only one of these foods, and $10.00 for each brand of agricultural lime. The fee is due in January of each year.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 10¢ per ton. The fee is based on annual tonnage reports filed on July 1.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show a chemical analysis stating the minimum percentages of nitrogen, total and available phosphoric acid, and potash soluble in water.

In the case of bone meal, tankage, etc., the statement of available phosphoric acid may be omitted.

In the case of agricultural lime, the chemical analysis must show the minimum percentages of total lime, total magnesia, lime and magnesia combined as carbonates, and lime sulphate.

Middle Atlantic States

Delaware[7]

Scope: The law applies to every substance imported, manufactured, prepared or sold for fertilizing or manuring purposes, except barnyard and stable manure, marl, lime and wood ashes.

Registration Fees: A registration fee of $1.00 is required for each brand registered. The fee must be paid annually before selling.

Tonnage Reports and Fees: In addition to the registration fee, an inspection fee is imposed at the rate of 10¢ per ton. The fee is based upon annual tonnage reports submitted on or before January 1.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the minimum percentages of nitrogen, available phosphoric acid, and potash soluble in distilled water.

Maryland[8]

Scope: The law applies to every commercial fertilizer, substance, or mixture sold for manurial purposes of which the selling price exceeds $5.00 per ton. Expressly excluded are ground gypsum, lime, ground limestone, ground shells, dung of all poultry or dung of domestic animals, in bulk, when sold as such and when not mixed with other fertilizer or fertilizing materials.

Registration Fees: An annual fee of $10.00 is required for each brand registered. The fee is payable on or before January 1. There is a special registration fee for pure or mixed culture of microorganism or other material to be used for promoting directly or indirectly the growth of higher plants.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 10¢ per ton. The fee is based on annual tonnage reports made on or before December 31. The law provides, however, that where the tonnage tax paid in any one calendar year exceeds the brand tax, the brand tax must be rebated.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the percentages of total nitrogen, available phosphoric acid, and water soluble potash.

In the case of unacidulated bone, tankage, fish, or other animal or vegetable matter used as fertilizer, the phosphoric acid may be guaranteed as total phosphoric acid provided that the minimum percentage of only the valuable constituent is given.

New Jersey[9]

Scope: Commercial fertilizers are defined in the law to include all materials containing nitrogen, phosphoric acid, or potash that are sold for a price exceeding $9.00 per ton. Expressly excluded are lime, limestone, marl, plaster, peat and peat muck, and the excrements and litter from domestic animals when sold in their natural state.

Registration Fees: An annual registration fee of 50¢ is required for each brand registered. The fee must be paid on or before June 30.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 15¢ per ton. The fee is based upon semi-annual tonnage reports submitted on January 1 and July 1.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash.

Unacidulated mineral phosphatic materials and basic slag must be guaranteed as to both total and available phosphoric acid and the degree of fineness. In the case of bone, tankage, and other natural organic phosphate materials, only the total phosphoric acid need be guaranteed.

Additional plant food elements may be guaranteed only by permission of the State Chemist.

New York[10]

Scope: The law applies to any commercial fertilizer or any material to be used as a fertilizer, except animal manure which has not been artifically treated or manipulated.

Registration Fees: An annual license fee of $20.00 is required for each brand registered. The fee must be paid on or before December 31.

Tonnage Reports and Fees: Tonnage reports and tonnage fees are not required.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the minimum percentages of nitrogen, potash soluble in distilled water, and available phosphoric acid.

In the case of undissolved bone, basic slag phosphate, wood ashes, untreated phosphate rock, garbage tankage and pulverized natural manures, the minimum percentage of total phosphoric acid may be shown.

In the case of ground limestones, marls, mussel shells, and other calcium and magnesium carbonates used for agricultural purposes, the minimum percentage of carbonates must be shown. In the case of burned or hydrated limes, the minimum percentage of calcium oxide and magnesium oxide must be shown, and the case of other materials containing calcium and magnesium compounds, the minimum percentage of carbonate present.

In addition, the law as amended requires a label statement showing the potential acidity or basicity of a mixed fertilizer in terms of pounds of calcium-carbonate-equivalent per ton.

Under a 1941 amendment to the basic law, labels must also show the minimum percentages of soluble and insoluble magnesium, sulphur, boron, or any other elements claimed to be of value in the fertilizer.

Pennsylvania[11]

Scope: The law applies to all substances imported, manufactured, prepared or sold for fertilizing or manuring purposes, except the dung of domestic animals, marl, lime and wood ashes.

Registration Fees: Annual registration fees must be paid before January 1 for every brand of fertilizer sold in the state. The fees are based on the amount sold during the appropriate preceding year. The fee is $15.00 for 150 tons or less; $20.00 for 150-250 tons; $30.00 for 250-400 tons; $40.00 for 400-500 tons; and $50.00 where the amount sold exceeds 500 tons.

Tonnage Reports and Fees: Tonnage or inspection fees are not required, other than those noted above. Affidavits of sales must be filed annually.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show in even units the minimum percentages of nitrogen, total phosphoric acid (except in mixed and superphosphate fertilizers), available phosphoric acid, and potash soluble in distilled water. The potash may be claimed "derived from" or "equivalent to" sulphate of potash, if there is not a sufficient amount of chlorine present to unite with ½ of 1% of actual potash.

Under the law, no commercial fertilizer having the word "tobacco" as part of its brand or trade name may contain muriate of potash, manure salts, kainit, or any other commercial potash combined with chlorine as chloride of potash.

West Virginia[12]

Scope: The law applies to any substance containing nitrogen, phosphoric acid, potash, or any other recognized plant food element or compound which is used primarily for its plant food content or for compounding mixed fertilizer unmanipulated animal and vegetable manure. A mixed fertilizer is defined as any combination or mixture of fertilizer materials designed for use or claimed to have value in promoting plant growth.

Registration Fees: An annual registration fee of $1.00 per brand is required.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of

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Basis for progress:

Pesticide Research

THE keystone in the arch of the chemical industry, is research. It is research that has made possible the rapid progress made in recent years in the field of pesticides. Never before in the history of agricultural technology have pesticides played such an important role as they have in the last five years. The phenomenal development of revolutionary new pesticides has accounted for the rapid advances associated with the industry. Growth will continue because ample supplies of food, forage and fiber cannot be produced without them. Secretary of Agriculture, Brannan, recently emphasized this point by saying . . . "Adequate machinery, fertilizers, and pesticides —*the farmer's tools of production*— must be kept available."

It might be well, therefore, to highlight a few of the valuable and significant contributions being made by the insecticide industry to the economic improvement and well being of the world.

Pesticides and Health

THE development of DDT and other new insecticides for controlling disease-carrying insects is recognized as one of the most important advances in medical history. The control of malaria, typhus, encephalitis, dengue fever, yellow fever, filariasis, and other diseases has improved the health of man and increased his life expectancy throughout the world.

Few people realize that malaria, the most important disease of man in the world, can be effectively and economically controlled merely by spraying insecticides within homes. According to the Expert Committee on Malaria, World Health Organization, " . . . territories whose total population reaches about 350 million are numbered among those where malaria is being mastered; and in a large part of these regions, the disease has already ceased to be a public health problem" . . . "there are almost 50 million inhabitants of different parts of the world, particularly in rural areas, who have been shielded against the scourge of malaria . . ." through the use of insecticides. Almost complete elimination of malaria from the United States was hastened by the spraying of 800,000 homes last year by the U. S. Public Health Service and the State Health Departments.

One of the greatest public health accomplishments yet achieved with insecticides was the outstanding control of major epidemics of louse-borne typhus during World War II. Today, in Korea, as well as in Japan, the use of pesticides in protecting our troops from insect annoyance and disease is a routine measure for increasing combat effectiveness.

by

J. Albert Woods*

President, Commercial Solvents Corp. New York, N. Y.

Pesticides and Timber

LUMBER is by far the major construction material. The depletion of our forest reserves, a vital factor in the prevention of floods and soil erosion, used to be more than a threat. However, today, millions of acres of valuable forests are saved annually from destruction by insect pests through aerial application of insecticides. The development of highly effective and cheap protectants has for the first time provided a tool with which to reduce tremendous losses from injurious forest insects in inaccessible areas. Heretofore, losses due to insect epidemics were accepted because no methods were known for directly combating forest pests.

In addition to protecting vital timber stands, millions of board feet of stored pulp wood, green logs, and lumber are rendered immune to insect attack by the use of insecticides. Protection does not halt there. Chemical preservatives are applied to structural timber to protect it from deterioration from termites and decay, saving countless sums in renovation and rehabilitation.

* From paper delivered before NAC Association, Sept. 5, 1951, Spring Lake, N. J.

Pesticides and Clothing

THE value of using new pesticides for cotton insect control has been clearly demonstrated in combating the boll weevil. The importance of control measures is illustrated by data obtained from the U.S.D.A.; in two community-wide experiments conducted in central Texas, fields which were sprayed or dusted produced a yield of 415 pounds per acre compared with 178 pounds from the untreated fields. The net profit was about $54. per acre. A similar large-scale test carried out in 1950 gave an average gain of $74.84 per acre. It is obvious what this type of control would have meant if applied to the entire heavily infested cotton area. In 1950 it is estimated that 3,900,000 bales and 1,600,000 tons of cottonseed were lost with a gross dollar damage of more than $900,000,000. Preliminary estimates indicate that the 1951 crop will be one of the largest if not *the* largest in our history.

This high yield will be due in no small measure to the use of pesticides. For example, cotton growers are treating crops even if no evidence of infestation is in sight, as compared to the old technique of application only after a 20 per cent infestation has been noted. The importance of pesticides as insurance can also be illustrated in another way—the farmer has a large investment in land, equipment, fertilizers, and seed, and for a few cents is able to insure his investment with the proper use of pesticides. In many instances banks and other lending agencies specify pesticide treatment for crops on which money is loaned.

Approximately four years ago one-third of all cattle hides produced in the United States were damaged by grubs, which meant an average loss of approximately 20 million dollars annually in this country alone. With the use of modern control measures, this loss has been greatly reduced. Dipping of sheep stimulates animal growth, giving higher yields of better quality wool.

Although damage to wool and wool products by insects has been estimated to be about one-quarter billion dollars per year, it is difficult to obtain reliable information. Needless to say, millions of dollars worth of clothing are saved through the use of insecticides to control moths, carpet beetles, and other destructive pests.

Pesticides are an important factor in protecting animals as well as plants which supply the fibers for our clothes and again protecting them from other pests after they have been produced as finished goods.

Pesticides and Food

EVERYONE recognizes that the use of toxic materials for pest control may be hazardous and that steps must be taken to safeguard workers in manufacturing plants, users of pesticides, and consumers of food products.

The present ballyhoo and hullabaloo, however, has placed all the emphasis on *hazards of use* rather than the *great benefits derived from their proper use*. Moreover, pesticides are *chemical protectants* rather than *chemical additives*. As protectants and used during production or storage, pesticides are certainly not in the same category with chemical additives which may be used in processing or preservation of food.

Legislation alone cannot replace actual policing of the food supply to insure quality and purity. An expanded research program on the toxicology of new pesticides and methods of their analysis is recognized as necessary and desirable. Greater effort to educate the user on the proper application of pesticides must be pursued.

It is only fair that the public be given all the facts and not just statements prefaced by the word "may" which arouses the fear of the American public against the methods of use and application of pesticides in the protection and storage of our food.

Fruit and vegetable pests must be controlled by chemical protectants or the grower will go out of business and the consumer will suffer. Of the large quantities of pesticides used, only small amounts come in direct contact with the edible portion, i.e. potatoes, peas, beets and corn. On foods where insecticides are directly applied, the timing of treatment is such that only minimum residues remain at harvest which in most cases are removed after further processing. It should be pointed out that with one of the most widely used insecticides, DDT, not one case of human death has been proved as due to exposure or from residues on foods.

In 1949, the value of crops saved from grasshoppers alone by insecticide control was placed at 72 million dollars—a saving of 55 dollars for each control dollar spent. Hundreds of other remarkable savings might be cited.

In 1950, over a million acres of small grain in Oklahoma, Texas, and Kansas became heavily infested with greenbugs. Up to that time there had been no known practical control for this serious pest. A new insecticide was successfully applied and saved many millions of bushels of needed small grains.

In the U. S., the many plant diseases that attack fruit, vegetable, cereal, and forage crops are estimated to cause losses amounting to 2 billion dollars each year. Many fruit and vegetable crops require the addition of fungicide dusts or sprays to prevent losses attributable to fungus or bacterial diseases. For example, in controlling late blight on potatoes and tomatoes, treatment is made to guarantee a marketable crop. Thus, routine application as a preventive must be made, regardless of whether the disease may be less prevalent than usual.

Plant growth regulators are receiving greater acceptance because of their value in controlling growth rates in the production of many fruits. This has resulted in the production of top quality products. Other uses of plant growth regulators are for improving storage qualities of both fruits and vegetables.

Many kinds of foodstuffs, including grain, cereals, flour, dried

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NFA

in big fall meeting—talks by Coleman, Totman, Krueger, Klipstein, Allstetter, planned

DR. RUSSELL COLEMAN

AN outstanding program was all set for the 1951 fall meeting of the National Fertilizer Association, being held November 12, 13 & 14 at the Atlanta Biltmore Hotel, Atlanta, Ga.

The group was to discuss current research and supply problems facing the industry, including a report on the recent fertilizer safety meeting held in Chicago.

The NFA board of directors planned to hold its meeting on Nov. 12, with the meeting proper getting under way on the 13th. W. M. Myers, director of Field Crops Research, U. S. Department of Agriculture, Beltsville, Md., was to address the NFA on "Potentialities in Grasslands Improvement" and H. R. Krueger, director of Technical Service, Phillips Chemical Co., Bartlesville, Okla., was to discuss "Safety in Fertilizer plants." Mr. Krueger is a member of the Advisory Committee of the National Safety Congress.

An address by J. E. Totman, Summers Fertilizer Co., Baltimore, Md., chairman of the NFA board of directors, is also scheduled.

Forum on Nov. 14

PRESENTING a forum for the morning program of Wednesday, the NFA group was to hear a discussion of government controls and orders affecting the fertilizer industry. Participants in the panel were to include W. R. Allstetter, Deputy Director, Office of Materials & Facilities, Production & Marketing Administration, U.S.D.A.; Cedric Gran, consultant, Agricultural Chemicals, Office of Price Stabilization, Washington, D. C.; Kenneth Klipstein, director, Chemical Division, National Production Authority; and Sheldon P. Wimpfen, Division of Raw Materials, Atomic Energy Commission.

The NFA hospitality committee, headed by J. Rucker McCarty, International Minerals & Chemical Corp., East Point, Ga., had made plans for a large registration at the Atlanta meeting, with indications pointing toward a possible record attendance.

Members of the hospitality committee, in addition to chairman McCarty, are: W. D. Barton, Tennessee Corp., East Point, Georgia; Ralph Boynton, United States Potash Company, Atlanta, Georgia; Moultrie J. Clement, Merchants Fertilizer & Phosphate Co., Pensacola, Florida; John L. Cope, The Reliance Fertilizer Co., East Savannah, Georgia; Frank R. Dulany, Southern States Phosphate & Fertilizer Co., Savannah, Georgia; M. S. Hodgson, Empire State Chemical Co., Athens, Georgia; Ray L. King, Georgia Fertilizer Co., Valdosta, Georgia; George W. McCarty, Ashcraft-Wilkinson Co., Atlanta, Georgia; J. J. Moore, The Southern Cotton Oil Co., Atlanta, Georgia; J. E. Nunnally, The Cotton Producers Association, Atlanta, Georgia; Howard A. Parker, Sylacauga Fertilizer Co., Sylacauga, Alabama; J. Fielding Reed, American Potash Institute, Atlanta, Georgia; John L. Sanders, Spencer Chemical Co., Atlanta, Ga.; A. H. Sterne, Tennessee Corporation, Atlanta, Georgia; E. M. Whiting, Fort Valley Oil Co., Fort Valley, Georgia; Travis S. Whitsel, Atlanta, Georgia; and A. L. Wiley, Swift & Co., Plant Food Division, Atlanta, Georgia.

Board of Directors meets Monday to open fall convention of NFA....Totman and Coleman make annual addresses to group....Government controls, grassland movement, safety discussed

A USDA chemist discusses factors involved in the selection of surface-active agents for making emulsifiable

Insecticide Formulations

EMULSIFIABLE formulations used in insect-control program may be defined as single-phase liquid systems containing an insecticide and one or more surface-active agents. On dilution with water they are dispersed to form emulsions, usually of the oil-in-water type. The insecticide may itself be a liquid—for example, a petroleum fraction—or it may be in solution—such as DDT in xylene. Since such liquids or solutions form the oil phase of the emulsions, they will be referred to hereafter as oils. The surface-active agents are commonly of the non-ionic class, because the emulsifying property of this class of agents is little affected by the hardness of the water. Many of these agents are miscible with the oils. Others require the addition of a coupling agent or mutual solvent for miscibility. Methods for the selection of surface active agents for testing in emulsifiable formulations and for the control of batch variations are presented in this paper.

Evaluation of Miscibility

IN the development of an emulsifiable formulation, trial-and-error methods are used commonly for the selection of surface-active agents for testing. Selections may be simplified however, when the miscibility of the agents with water and with the specific oil to be emulsified has been evaluated. Such evaluations may be made in three-component liquid systems containing one pair of partially miscible components and two pairs of miscible components. The systems used for determining the water miscibility of agents that are partly miscible with water are prepared by adding water to a single-phase system consisting of an agent and a water-miscible solvent until a two-phase system is obtained. The greater the amount of water required for this change in the number of phases, the more water- miscible is the agent. The systems used for determining the oil-miscibility of agents partly miscible with a specific oil, are prepared by adding a solvent, miscible with the oil and a specific agent, to a two-phase system consisting of the oil plus the agent until a single-phase system is obtained. The smaller the amount of oil-miscible solvent required for this change in the number of phases, the more miscible is the agent with the specific oil. The agent may be either more or less miscible with another oil. Since any given agent may not be equally miscible with all oils, it is indicated that its relative hydrophilic-hydrophobic properties may be variable with reference to water-oil systems in general.

The method for the evaluation of the miscibility of non-ionic surface-active agents in three-component systems, may be illustrated with examples of two types of such systems. For one type, highly refined oleic acid is added from a burette to a two-phase system consisting of 45 grams of white mineral oil (Saybolt viscosity at 100° F., 50-55 seconds), or xylene (industrial grade) plus 5 grams of agent, until a single-phase system is formed at about 73° F. The minimum weight of oleic acid required to change the two-phase system to a single-phase system is expressed as a fraction of the total weight of the resulting three-component system. For convenience, the reciprocal of this fraction is the white mineral oil or the xylene miscibility index. Systems of this type are useful when an oil and an agent are miscible with oleic acid, and are also partially miscible with each other. For the other type of three-component systems, water is added to a single-phase system comprising 45 grams of nearly anhydrous isopropyl alcohol, plus 5 grams of agent, until a permanent turbidity appears at about 73° F. The minimum weight of water required to change the single-phase system to a two-phase system is expressed as a fraction of the total weight of the resulting three-component system. This fraction multiplied by 100 is the water miscibility index. Systems of this type are useful when the agent is miscible with isopropyl alcohol and partially miscible with water.

The miscibility indexes with reference to white mineral oil, xylene, or water of 35 non-ionic surface active agents are listed in Table 1. The mineral oil and xylene were selected as representative types of oils often included in emulsifiable formulations. The data refer to these oils specifically and may be only indicative of miscibility indexes with reference to other oils. The agents were homogeneous when tested at a room temperature of about 73° F. They were selected as being representative products without regard to their sources or their emulsifying properties. Some of the agents were miscible with the white mineral oil, or xylene, or water. Such agents have very high miscibility indexes with reference to the specific solvent or solvents in which they are miscible. With other agents, the addition of 50 grams of oleic acid failed

by
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to change the two-phase system to a single-phase system. These agents have very low oil miscibility indexes. With still other agents, the addition of 50 grams of water failed to change the single-phase system to a two-phase system. These agents are considered to have very high water miscibility indexes.

Selection of Agents

DATA of the type given in Table 1 are useful in the selection of candidate surface active agents for test batches of emulsifiable formulations. If an agent is miscible with the oil to be used and has a high water-miscibility index, the formation of an oil-in-water emulsion can be expected on dilution with water of a formulation containing such an agent. For example, "Emery X 523-R" is miscible with white mineral oil and has a water-miscibility index of 42.3, and "Antarox A-400" is miscible with xylene and with water. Conversely, if an agent is miscible with an oil and has a low water-miscibility index, the formulation of a water-in-oil emulsion can be expected on dilution, with water, of a formulation containing such an agent. For example, "Span 85" has such properties, being miscible with the white mineral oil and xylene and having a water-miscibility index of only 3.1.

Some of the surface-active agents are partly miscible with white mineral oil or xylene and have high oil and water miscibility indexes. For example, "Emulphor AG" has a white-mineral-oil miscibility index of 34.4 and a water-miscibility index of 41.4, and "Ethofat 142/20" has a xylene miscibility index of 66.7 and

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Table 1. Sources and miscibility indexes of 35 non-ionic surface-active agents[1]

Product and source	Miscibility index: White mineral oil	Xylene	Water
General Aniline & Film Corporation			
Antarox A-201	4.7	M	M
Antarox A-400	5.8	M	M
Antarox B-100	30.3	M	42.2
Antarox B-290	2.9	21.7	M
Emery Industries, Inc.			
Emery X523-R	M	M	42.3
Emery X539-R	9.3	M	>50.0[2]
General Dyestuff Corporation			
Emulphor AG	34.4	M	41.4
Emulphor ELA	2.9	18.9	M
Armour and Company			
Ethofat 142/20	3.3	66.7	>50.0[2]
Atlas Powder Company			
G-1266	3.3	M	29.2
General Dyestuff Corporation			
Igepal 300	5.6	M	M
Onyx Oil and Chemical Company			
Neutronyx 330	3.4	M	M
Neutronyx 600	5.4	M	M
Neutronyx 834	5.3	M	41.2
Nopco Chemical Company			
Nopalcol 1-L	M	<2[2]	2.4
Nopalcol 4-O	M	<2[2]	29.4
Nopalcol 6-AO	7.4	(3)	M
Nopalcol 6-AR	2.0	30.3	M
Onyx Oil and Chemical Company			
Onyxol 9162	5.3	M	M
Glyco Products Company			
Polyethylene glycol—			
400 monolaurate	5.1	100.0	M
400 monooleate	11.0	71.4	>50.0[2]
600 monooleate	7.2	M	>50.0[2]
400 di-triricinoleate	10.6	M	6.5
Atlas Powder Company			
Span 20	M	M	31.3
Span 80	M	M	13.3
Span 85	M	M	3.1
Carbide & Carbon Chemicals Corporation			
Tergitol NPG-101	4.9	M	M
Rohm and Haas Company			
Triton B-1956	M	M	24.1
Triton X-45	17.5	M	>50.0[2]
Triton X-100	5.0	M	M
Atlas Powder Company			
Tween 20	2.8	(3)	M
Tween 21	12.8	(3)	46.0
Tween 40	3.8	(3)	>50.0[2]
Tween 80	4.4	(3)	M
Tween 85	71.4	(3)	42.5

[1] M = miscible with the solvent indicated.
[2] No change in number of phases on addition of 50 grams of oleic acid or water.
[3] Not determined.

Industry Wide Conference Elects Fields at Chicago

Fertilizer Safety Meeting

AN enthusiastic crowd of more than 200 was in attendance at the organizational meeting of the new Fertilizer Subsection of the Chemical Division of the National Safety Council in Chicago, October 11. The fertilizer industry group, meeting at the Stevens hotel, elected as chairman, J. S. Fields, Safety Director of Phillips Chemical Co., Bartlesville, Okla. Other officers were elected as follows: vice-chairman, J. E. Smith, Safety Director, Spencer Chemical Co., Pittsburg, Kansas; and Vernon S. Gornto, Smith-Douglass secretary-treasurer. A. B. Pettit, Superintendent of Industrial Health and Safety, Davison Chemical Corp., Baltimore, Md., had acted as general chairman of the group for the past year, and was in charge of the Chicago meeting.

The group voted to operate under the authority of a 12-man Executive Board, each member of which is to serve for a year.

Chairman Pettit opened the meeting with a summary of organizational plans and objectives, pointing out the advantages to be gained by an active, overall safety program throughout the fertilizer industry. He reviewed the steps taken by the fertilizer Safety Committee in preparing for the Chicago meeting and introduced the speakers scheduled to appear on the program of the day.

W. W. Watmough, Jr., vice-president of the Mixed Fertilizer Division of Davison Chemical Corp. told the group about the responsibility for safety carried by top management and the benefits to be derived by the industry from safe operations.

He reviewed the history of the fertilizer industry from a safety standpoint, pointing out that only a few years ago the standard work schedule called for a 10 hour day, six days a week, with 100% unskilled labor using picks and shovels amid an atmosphere of dust and fumes. The operations were of seasonal nature, he recalled, making it necessary for some 80% of the workers to be laid off part of the year. This created an unusually high turnover, of personnel and attracted only the lowest quality of worker. "It was a bad start so far as safety was concerned," he declared.

But today's picture is much brighter, he said. The general scene reveals many more modern plants

Left: (L to R) J. E. Smith, Spencer Chemical Co., Kansas City, Mo., newly-elected vice-president of the Fertilizer Safety group; J. S. Fields, Phillips Chemical Co., Bartlesville, Okla., general chairman; and Vernon S. Gornto, Smith-Douglass Co., Norfolk, Va., secretary-treasurer.

Lower photo: (L to R) Dr. Russell Coleman, president, National Fertilizer Association, Washington, D. C.; Mr. Fields; A. P. Pettitt, Davison Chemical Corp., Baltimore, Md.; H. R. Krueger, Phillips Chemical Co., Bartlesville, Okla.; and Paul T. Truitt, president, American Plant Food Council, Washington, D. C. Mr. Pettitt was general chairman in charge of the Chicago meeting and Mr. Krueger was chairman of the nominating committee.

Above: Part of the Advisory Committee at the Chicago meeting. Front row, (L to R): J. M. Sisson, H. R. Krueger, J. F. Smith, Jack Fields, A. B. Pettitt and Vernon S. Gornto. Second row (L to R): C. W. Best; Dr. Van Atta, Wills S. Buie, C. A. Cox, U. E. Ellis, William T. Doyle, and Dr. Russell Coleman. Back row, (L to R): F. Wayne High, J. S. Mark, Walter Lehle, Wm. C. Richardson, G. W. Pittock, Thomas J. Clarke and Paul T. Truitt.

with the industry turning out more than 18 million tons of fertilizer materials each year as compared to only five million in 1933. Progress has been made in safety, too, but not to as great an extent as is needed. He emphasized that to attain safe operation, there is no magic formula. However, there are three rules to observe in gaining ground. These include the establishment of a sound safety program; complete line authority, (of foremen, supervisors, etc.) and 100% cooperation of everyone in the organization, "from president down to the janitor," he declared. Without this kind of a setup, the safety program is likely to break down since the carelessness of one or two persons can wreck the entire program.

But first of all, top management must be "sold" on the value of better safety practices, he said, and urged the safety men present to keep urging more and more emphasis on increasing safety in their respective plants.

Symposium Appears

A PANEL of experts took part in a symposium on "Achieving Safety in Fertilizer Plants." J. W. Sisson, safety officer of the Tennessee Valley Authority, Wilson Dam, Ala., acted as chairman of the panel which featured David P. Delavan, chemical superintendent, Pasadena Fertilizer Plant of Mathieson Chemical Corp., Pasadena, Texas; H. R. Krueger, director of Technical Service, Phillips Chemical Co., Bartlesville, Okla.; U. C. Ellis, general superintendent, Plant Food Division, Swift & Co., Chicago; C. E. Killebrew, sales manager, The Frank G. Hough Co., Libertyville, Ill.; and M. F. Wharton, secretary-treasurer, Arizona Fertilizer Inc., Phoenix, Ariz.

Mr. Delevan emphasized the unusual importance of protective goggles, gloves and other safety apparel for fertilizer plant personnel, terming such as "musts" if a favorable safety record is to be maintained in the handling of sulfuric acid. He placed particular stress on complete protection of the worker, from head to foot.

Mr. Krueger, talking on the handling of anhydrous ammonia and ammonia solutions, described the pitfalls of carelessness in loading and unloading tank cars of ammonia. He went into detail pointing out safe practices along this line. (His paper appears elsewhere in this issue)

The handling of bulk storage was discussed by Mr. Ellis who warned the fertilizer men of dangers involved when workmen attempt to dig materials out of bins and allow an overhang to form; or to leave a high, almost perpendicular wall of fertilizer material in the bin. Here, the condition of the pile should be determined and the crest pried loose from above. "When the man is on top of the pile, the pile can't be on top of the man," he said.

Safe handling of explosives was discussed by the Swift superintendent, who described the "multiple charge" method of breaking up a caked pile of fertilizer material. He said that by arranging a delayed-firing technique, it is possible to use a much heavier charge of dynamite without damage to the building and with better results regarding the physical conditions of the material itself. The boring of perpendicular holes in the pile from the top, and inserting explosives in them, is a recommended method, he said.

The saving of numerous man-hours and added safety in fertilizer plants was discussed by C. E. Killebrew. Speaking on "Operation of Mobile Equipment," he told about some of the hazards involved in operating such, pointing out that safe operation is a challenge to the manufacturer, the machine owner, the operator and his supervisor. "The responsibility is widely spread, yet closely related," he said. From the manufacturer's viewpoint, he listed some of the basic requirements of a machine such as the "Payloader" made by his firm. The unit must be easy to handle, speedy, powerful, rugged, highly maneuverable, and must give the operator clear vision in all directions.

He pointed out the necessity for good judgment on the part of operators in determining the safe operating speed in a given plant. Such good judgment, however, is not always exercised, he said, so that the machine's top speed has been reduced in many cases to enforce the observance of safe operation.

Conditions in various plants are not conducive to safe operation of mobile equipment, Mr. Killebrew said. He displayed photographs of machines being operated where the driver had to "duck" in passing under low beams, and where there was insufficient space on loading platforms to turn a machine safely. He also recalled instances where machines were used to dig at a bin full of fertilizer material under a dangerous overhang.

So far as efficient and safe operation of the machines themselves are concerned, he said, the makers have built in every protective device possible. But in many cases the operators remove motor governors to get higher speeds, allow the steering mechanism to wear dangerously, neglecting to make simple adjustments; fail to replace worn brakes; and place old rags in the gasoline tank opening instead of the regular cap. This presents both a fire hazard and a mechanical liability so far as the motor is concerned. The attachment of backfire arrestors as a fire preventive was also recommended by the speaker.

"The importance of Good Housekeeping in Lowering Costs" was the title of a paper by Mr Wharton, who was unable to be at the meeting. In his absence, the paper was read by Mr. Fields. It pointed out the hazards involved in allowing too much dust to accumulate in a plant. Poor visibility leads to accidents as well as inefficiency, particularly when a worker is unable to read dials and scales properly. Dust is abrasive and causes excessive wear on machinery, it was pointed out, but on the contrary, plants with dust-free operations have better maintenance records.

Orderliness in a plant is important from the standpoint of both efficiency and safety. He told of one plant where time checks were made (without knowledge of the workers involved) showing a saving of 20 minutes when a crew stacked a carload of bagged material in an orderly manner as compared with another crew which piled up the bags without regard to symmetry. In addition to the time saved, the paper said, bag breakage from the chaotic stack of bags numbered 53 against six in the orderly pile. Safety enters into the picture when a well-stacked pile of bags remains intact for long periods of time while a haphazardly placed pile may threaten to fall.

The meeting ended with a sound film on safety presented by the Liberty Mutual Insurance Co., Chicago.

Discussions at the meeting covered many phases of plant safety. Dr. F. A. Van Atta, staff industrial hygienist of the National Safety Council and staff representative to the Fertilizer Section, answered a number of questions put to him by the group, particularly in regard to reporting of accidents and the establishment of uniform terminology covering "lost time," "medical aid" and "hospitalization." Dr. Van Atta told the group that the Council seeks all the information possible regarding accidents and their severity in order to gain a clear picture of the situation. Gordon W. Pittock, general superintendent, Fertilizer Operations of William Stone Sons, Ltd.,

(Turn to page 95)

Advisory Committee elected at Chicago, October 11, 1951*:

John Mark, Naco Fertilizer Co., Charleston, South Carolina; Frank Dulany, Southern States Phosphate and Fertilizer Company, Savannah, Georgia; Ralph Frazer, Summers Fertilizer Co., Baltimore, Maryland; R. Q. Smith, Pacific Chemical and Fertilizer Co., Honolulu, Hawaii; F. E. Johnson, Gates Bros. Fertilizer Div., Wendell, Idaho; Dan Williams, Minnesota Farm Bureau, St. Paul, Minnesota; Vernon S. Gornto, Smith-Douglass Company, Inc., Norfolk, Virginia; Willis S. Buie, Canada Packers, Toronto, Canada; A. D. Kincaid, Southern Cotton Oil Co., Columbia, South Carolina; R. E. Bennett, Farm Fertilizers, Inc., Omaha, Nebraska; U. C. Ellis, Plant Food Division, Swift and Company, Chicago, Illinois; Dewey Lange, Lange Brothers, St. Louis, Missouri; and C. W. Best, Robertson Chemical Company, Norfolk, Virginia.

* All new members had not been notified of appointment at press time.

Advisory Committee elected before October 11 meeting. These will continue as committee members.

T. J. Clarke, Director of Personnel and Director of Safety in Fertilizer Div., G. L. G. Exchange, Ithaca, New York; Dr. Russell Coleman, president, National Fertilizer Assoc., Washington, D. C.; J. S. Fields, Safety Director, Phillips Chemical Company, Bartlesville, Oklahoma; Charles E. Heinrichs, vice-president, Virginia-Carolina Chemical Corp., Richmond, Virginia; F. Wayne High, Manager of Operations, The Baugh Chemical Company, Baltimore, Maryland; R. L. Hugg, Labor Relations, Supervisor, Internat'l Minerals & Chemical Corp., Chicago, Illinois.

John Kobe, Plant and Mine Manager, Simplot Fertilizer Company, Pocatello, Idaho; H. R. Krueger, Director Technical Service, Phillips Chemical Company, Bartlesville, Oklahoma; Walter Lehle, Asst. to Director of Operations, Mathieson Chemical Corporation, Baltimore, Maryland; A. B. Pettit, Supt. Industrial Health & Safety The Davison Chemical Corporation, Baltimore, Maryland; Gordon W. Pittock, General Superintendent, Fertilizer Operations, William Stone Sons, Limited, Ingersoll Ontario, Canada; W. C. Richardson, Asst. Mgr. Fertilizer Service, Southern States Cooperative, Richmond, Virginia; Edwin W. Rowbottom, Chemical Engineer, The Best Fertilizer Company, Oakland, California.

J. Lauren Shopon, Safety Director, Consumers Cooperative Association, Kansas City, Missouri; J. M. Sisson, Safety Officer, Tennessee Valley Authority, Wilson Dam, Alabama; J. E. Smith, Safety Director, Spencer Chemical Company, Pittsburg, Kansas; F. N. Strudwick, Safety Engineer, William B. Tilghman Co., Salisbury, Maryland.

Paul T. Truitt, president, The American Plant Food Council, Washington, D. C.; M. F. Wharton, Arizona Fertilizers, Inc., Phoenix, Arizona; Roy White, Supv. Safety, Personnel & Plant Protection, Lion Oil Company, El Dorado, Arkansas; F. J. Woods, president and treasurer, Gulf Fertilizer Company, Tampa, Florida; M. S. Wright, president, Texas Farm Products Company, Nacogdoches, Texas; William T. Doyle, president, Sturtevant Mill Company, Dorchester, Boston, Mass.; and S. C. Smith, president, The Smith Company, Uvalde, Texas.

Washington, D. C. Meeting Site for four groups of agricultural

Control Officials

ANNUAL conventions of four groups of control officials were held successively from October 1-6 at the Shoreham Hotel, Washington, D. C. The groups were: the Association of Official Agricultural Chemists; American Association of Feed Control Officials; Association of American Fertilizer Control Officials and the Association of Economic Poisons Control Officials.

Officers elected at the meetings were as follows:

Association of Official Agricultural Chemists: Henry A. Lepper, Food & Drug Administration, Washington, D. C., president; H. J. Fisher, New Haven Conn., vice-president; and K. I. Milstead, Food and Drug Administration, Washington, D. C., secretary-treasurer. Mr. Lepper, formerly secretary-treasurer, succeeds H. A. Halverson, St. Paul, Minnesota, as president. To the Executive Committee was added K. D. Jacob, U. S. Department of Agriculture, Washington, D. C., while Mr. Halverson, as retiring president, becomes a member of the Committee.

Photos Below:

The State Fertilizer Control Officials were invited to two dinners in Washington during the annual meeting. Top photo: scene at the Shoreham when the officials were guests of the American Plant Food Council. Lower picture: group at the Mayflower Hotel as guests of the National Fertilizer Association. (Photos by APFC and NFA, respectively)

Feed Control Officials: F. W. Quackenbush, Lafayette, Indiana, president; J. D. Patterson, Sales, Oregon, vice-president; and Marvin Snyder, Morgantown, W. Virginia, was elected to the executive committee.

Fertilizer Control Officials: J. F. Fudge, College Station, Texas, president, succeeding Rodney C. Berry, Richmond, Va.; P. A. Yeats, Oklahoma City, Okla., vice-president, replacing Mr. Berry. Bruce D. Cloaninger, Clemson, S. Carolina, was named secretary-treasurer, succeeding himself.

Economic Poisons Control Officials: E. W. Constable, Raleigh, N. C., succeeding Allen B. Lemmon, Sacramento, Calif. as president, Rod

ney C. Berry, Richmond, Va., vice-president; succeeding Mr. Constable; and A. B. Heagy, College Park, Maryland, to succeed himself as secretary-treasurer.

Named to the executive committee for regular two-year terms, were W. G. Reed, U. S. Department of Agriculture, Washington, D. C. and E. A. Epps, Baton Rouge, La. To complete the term of Mr. Berry, the Fertilizer Officials elected G. H. Laramie, Concord, New Hampshire.

Prominent in all discussions at the week-long convention was recognition of new problems facing the control official, such as the mixing of fertilizers and pesticides, the increasing use of liquid fertilizers and the need for further education of the public on the value of pesticides in agriculture.

Pointing up the greatly increasing use of fertilizers in irrigation water in the far west, F. H. Leavitt, Shell Chemical Co., San Francisco, Calif. described to the fertilizer group some of the methods used in this connection. He reported that at least 75 companies in California are engaged in custom application of fertilizer in irrigation. Methods employed by these operators are varied, he said, but most use one of four kinds of liquid fertilizers: two different ammonium nitrates, liquid phosphate and liquid potash. Special precautions must be taken with the application of anhydrous ammonia, a gas, and the problem of the control official is particularly difficult in testing this type of fertilizer.

Mr. Leavitt showed a series of slides picturing methods of application, as well as facilities for both transporting and storing liquid fertilizers.

The mixing of pesticides and fertilizers was viewed critically by both the fertilizer and economic poisons control officials, both groups passing resolutions to prohibit such use "for agricultural crops or horticultural use" unless expressly recommended by the experiment station in the state. The groups indicated that this resolution is not a blanket condemnation of the practice, but rather a brake on too-fast development before ample data is gained.

In a report before both groups, A. B. Lemmon, A.E.P.C.O. president, pointed up the difficulties involved in manufacturing, storing, applying and testing such mixtures. If labeled as a fertilizer, the insecticidal material may be termed as "inactive ingredients," and if labeled an insecticide, a full account of the fertilizer present may not be available.

Present Controls Adequate

DISCUSSING the adequacy of existing controls on the industry, John D. Conner, Washington attorney, declared in a talk before the A.E.P.C.O., that in his opinion, "There is no necessity for additional legislation." He based his conclusion on the fact that although given authority to "establish . . . the quantity of the various pesticidal materials which may remain on any food," the Federal Security Administrator has never exercised his tolerance-setting authority except to a "very minor degree." Mr. Conner reminded that in 1944, tolerances for fluorine on apples and pears were established by regulation, but later invalidated by a U. S. Circuit Court of Appeals. "No other tolerances have been established under this authority," Mr. Conner declared.

For the period of a year, he pointed out, evidence on all phases of residues on fresh fruits and vegetables was presented to the Food and

Past and present officers of Fertilizer Control Officials group. (L to R): Dr. J. F. Fudge, College Station, Texas, newly-elected head of the Association, chats with past presidents Dr. John B. Smith, Kingston, Rhode Island; Allen B. Lemmon, Sacramento, Calif.; and Dr. Rodney C. Berry, Richmond, Va. (Photo by Louis H. Wilson, APFC.)

Fertilizer Control Officials: (L to R) Dr. Berry, ex-officio member of executive committee; P. A. Yeats, Oklahoma City, vice-president; Dr. B. D. Cloaninger, Clemson, S. C., secretary-treasurer; Dr. Fudge, president; G. W. Michael, Ottawa, Ontario, Canada, holdover member of the executive committee; and R. W. Ludwick, State College, New Mexico, newly-elected member of executive committee. Absent when photo was taken were H. A. Davis, Durham, New Hampshire, executive committee member and W. S. Thompson, Columbus, Ohio, also a member of the executive committee. (Photo by Univ. of Maryland)

Drug Administration during its hearing during 1949 and 1950. Although it has been over a year since these hearings were concluded, it appears that it will be several more months before the proposed tolerances are issued, he observed. After that, he continued, interested parties may file exceptions and supporting briefs, and with this additional material at hand, the evidence must be reviewed again before a final order is issued.

"In the absence of the exercise of this authority, its full extent must remain . . . a matter of speculation," Mr. Conner said, but added that interpretation is that after tolerances are issued for the pesticides which the Administration deems to be necessary in the production of any class of foods, "the presence of any residue in excess of that amount, or of any residue at all of a material for which no tolerance is specified, will result in the adulteration of the food as a matter of law."

"From a substantive standpoint, this would appear to afford

(*Turn to page* 89)

In The Photos

Top Photo: New president of Fertilizer Officials, Dr. Fudge, (left) is congratulated by Paul T. Truitt, president, American Plant Food Council. (Photo by Louis H. Wilson, APFC) 2nd photo: New president, Economic Poisons Control Officials, Dr. Constable, chats with retiring head of the A.E.P.C.O., Allen B. Lemmon. 3rd photo: (L to R) Joseph Noone, technical adviser, National Agricultural Chemicals Association; A. B. Heagy, secretary-treasurer of A.E.P.C.O.; Dr. J. L. St. John, Washington, D. C.; and Lea S. Hitchner, executive secretary and treasurer, National Agricultural Chemicals Association.

Lower photo: A.E.P.C.O. officials (L to R): Dr. Heagy, Dr. Constable, Mr. Lemmon, Rodney C. Berry and E. A. Epps. Mr. Epps, Baton Rouge, La., is a newly-elected member of the executive committee.

Netherland Plaza Hotel, Cincinnati, Place for December 10 - 12 Joint Meeting of

Entomologists, Phytopaths

COMPLETE programs have been announced by the American Phytopathological Society and the American Association of Economic Entomologists for their joint meeting to be held at the Netherland Plaza Hotel, Cincinnati, Ohio, December 10-12. The meeting will include symposia on fruit fungicides, seed treatments, fungicides and chemotherapy, nematology and a fungicide colloquium for the phytopath group as well as joint sessions with the entomologists. In the latter category are scheduled a symposium on insect-transmitted plant diseases; a joint extension symposium; joint symposium on teaching and another on pesticides. The joint meetings with the A.A.E.E. include also the Entomological Society of America, which is holding its convention at the Netherland Plaza at the same time. In addition, the Potato Association of America will also have its annual convention in connection.

The first of the joint symposia will be held Monday evening, December 10, under the co-chairmanship of H. E. Petty, University of Illinois, entomologist, and L. O. Weaver, plant pathologist. W. W. Sunderland, Dow Chemical Co., Midland, Michigan, will talk on "Existing and Proposed Legislation on Application of Agricultural Chemicals" and E. L. LeClerg, U.S.D.A., on "Recent Legislation Dealing with Pesticides."

Three speakers will discuss methods of "Stimulating Insect and Disease Control Practices." These are listed on the advance program as Charles Chupp, Cornell University; Francis Burns and Jerry Hirter.

A second joint symposium is scheduled for the afternoon of December 11, where the entomologist-plant pathologists will discuss insect-transmitted plant diseases. Chairman of this symposium is W. L. Popham, assistant chief, Bureau of Entomology and Plant Quarantine, U.S.D.A., Washington, D. C. C. W. Bennett, Riverside, California, will discuss "The Origin and Distribution of New or Little Known Virus Diseases;" F. O. Holmes, Rockefeller Institute for Medical Research, the "Geographical Isolation of Some Virus Diseases;" and J. H. Freitag, University of California, Berkeley, "Insect Vector—Plant Virus Relationships." W. F. Turner, U.S.D.A., Ft. Valley, Ga., is to be the fourth man appearing on the panel.

Still another joint session is scheduled for the afternoon of December 12, in a symposium on teachings. Co-chairmen of this meeting will be L. H. Townsend, entomologist; and G. C. Kent, plant pathologist. Taking part in this portion of the program will be S. A. Graham, University of Michigan; W. C. Paddock, Pennsylvania State College; W. H. Bragonier, Iowa State College; M. C. Shurtleff, Univ. of Rhode Island; Dwight Powell, Univ. of Illinois; C. F. Bishop, Univ. of West Virginia; J. H. Lilly, Iowa State College, and E. G. Sharvelle, Purdue University.

A concurrent symposium will cover the subject of pesticides. Co-chairmen of this session will be Carl J. Weinman, entomology and George L. McNew, plant pathology. The program will be as follows:

The Principles and Progress in Systemic Protection of Plants. (a) "Insecticides," A. Bruce Gleissner, American Cyanamid Co. and (b) "British Research on Systemic Fungicides," Eric Sharvelle, Purdue Univ. "The Interaction (Compatibility, Phytoxicity and Pesticidal Potency) of Insecticides and Fungicides in Simultaneous Application." A. B. Groves, Virginia Agric. Exp. Sta., Winchester. "Legislative Control of Pesticide Usage," George C. Decker, Illinois Natural History Survey. "The Cost of Research in Agricultural Chemicals," R. H. Wellman, Carbide and Carbon Chemicals Co. and "The Toxicology and Hazards Record of New Pesticides," Frank Princi, Univ. of Cincinnati.

APS Sessions

SEVERAL sessions of the APS meeting will deal with fungicides in various categories. A section on fruit fungicides under the chairmanship of Thomas T. McClure, is scheduled for Monday afternoon. Appearing on this program will be Curtis L. Mason, Univ. of Arkansas; Alvin J. Braun, New York State Agri. Exp. Sta., Geneva; Robert H. Fulton, John P. Tomkins, E. S. Beneke, and William J. Young, Michigan State College; H. F. Winter, Ohio Agricultural Experiment Station; H. H. Foster, S. Carolina Agri. Exper. Station; M. C. Shurtleff and V. G. Shu

Unusually comprehensive program covers broad scope of problems involved in control of insects and plant diseases. Numerous joint sessions to cover subjects of common interest between entomologists and plant pathologists at Netherland Plaza.

tak, Univ. of Rhode Island; and Eric G. Sharvelle and J. S. Vandermark, Purdue University.

The program of Monday evening will include a section on seed treatments, in charge of E. D. Hansing. J. W. Heuberger, Delaware Agricultural Experiment Station will report on a new ethyl mercuric perthiocyanate seed treatment; E. D. Hansing on "Panogen" and "Vancide 51" for control of smut and blight; and Axel L. Anderson, U.S.D.A., on "Control of Bean Anthracnose in Navy Beans by Seed Treatment."

One of the morning sessions of Tuesday, will be a section on Fungicides and Chemotherapy, with Saul Rich in charge. The program for this section is as follows.

Comparative Effectiveness in Control of Early Blight on Potato and Tomato of Differently Formulated Dithiocarbamates," J. D. Wilson, Ohio Agric. Exp. Sta. "Comparison of Cycloheximics (Anti-dione) with Ten Other Fungicides for the Control of Turf Diseases," John R. Vaughn and William Klomparens, Michigan State Coll. "Effect of Cycloheximide (Anti-dione) and Some Environmental Factors on the Germination of Spores of *Monilinia fructicola & Botrytis cinera*," Andrew Thanos, Michigan State Coll. "The Effect of Tetrachloro-p-benzoquinone on Certain Fermentative Enzyme Systems in Fungi," P. E. Hochstein and Carroll E. Cox, Univ. Maryland. "Lipid-solubility and Fungitoxicity," Saul Rich and James G. Horsfall, Connecticut Agri. Exp. Sta. "Fungitoxicity of Compounds Possibly Concerned in the Mode of Action of Sulfur and Ferbam," S. E. A. McCallan, Laurence P. Miller and Richard M. Weed, Boyce Thompson Institute. "Interaction Between Fungus Spores and Sulfur, Ferbam, and 2-Heptadecyl-2-imidazoline as shown by Radioactive Tracers," Lawrence P. Miller, S. E. A. McCallan and Richard M. Weed, Boyce Thompson Institute. "Chemotherapeutic Activity May Be Independent of Fungitoxicity," David Davis, Connecticut Agri. Exp. Sta. and "2-Carboxymethylmercaptobenzothiazole Salts as Chemotherapeutants for Plant Diseases," A. E. Dimond and David Davis, Connecticut Agri. Exp. Sta.

Tuesday afternoon's sessions will include one on Nematology and Soil Treatments. E. J. Cairns is section leader, with a total of 12 papers being scheduled for delivery. Among these are the following: "Soil Fungicides," by George A. Zentmyer, Univ. of California; "Nematode Diseases and Their Control in Mushroom Crops," by Dr. Cairns; and "Comparison of Two Nematocides Used at the Time of Planting a Winter Cover Crop," by H. W. Crittenden, Delaware Agri. Expr. Station.

Colloquium Scheduled

As has been scheduled for the past several years, a fungicide colloquim will be held on Tuesday evening, following the annual APS banquet. Dr. L. Gordon Utter, Phelps Dodge Refining Corp., New York, is chairman of the session which is to include the following program:

"Federal Legislation," L. S. Hitchner, executive secretary, National Agricultural Chemicals Association, Washington, D. C.; "Toxicology of Fungicides," Henry H. F. Smyth, Jr., Mellon Institute; "Program of Science Service Laboratory, London, Ontario," Herbert Martin, director; "Concentrate Sprays-Fruits," Dean Asquith, Pennsylvania State Coll.; "Concentrate Sprays-Vegetables," J. D. Wilson, Ohio Agric. Exp. Sta.; "Antifungal Antibiotics," W. Keith Smith, Univ. Rhode Island and Imperial Chemical Industries, Butterwick Lab., England.

New Fungicide Products will be discussed by industry representatives. Opportunity is given manufacturers to describe experimental work on various fungicides which have not yet been placed on the market. Printed or mimeographed data sheets may be distributed by the speakers in connection with their presentations. (Those desiring to appear on this portion of the program should contact Lea S. Hitchner, National Agricultural Chemicals Association, Barr Building, Washington 6, D. C., or Dr. L. Gordon Utter, Phelps-Dodge Refining Co., 40 Wall St., New York, soon as possible.)

A.A.E.E. Meeting

THE entomological portion of the program includes of course the joint sessions with the phytopath group as mentioned previously, and in addition, a comprehensive program of its own. A synopsis of the entomological program indicates the scope of subjects to be covered. Reports will be presented on the Ninth International Congress of Entomology held during the summer; a section on apiculture; papers on insects affecting fruits; another on insecticides, and a section on biological control of insects.

Papers will be submitted on insects affecting vegetables, cereal and forage crops, forests and shade trees. Titles of specific papers had not been announced at press time, the deadline for such having been set for October 30 by the Association.

However, a special session on insect pest surveys was listed as "tentatively complete." It is scheduled for the afternoon of December 13, with Avery S. Hoyt, chief of the Bureau of Entomology and Plant Quarantine, U.S.D.A., Washington, D. C., as chairman. The tentative program is as follows:

"History of State-Federal Insect Pest Surveys," J. J. Davis, Purdue University; "Importance and

(*Turn to page 95*)

Safe handling of

Ammonia & Solutions

ANH[illegible] ammonia [illegible] ium nitrate [illegible] and urea-aqua ammonia [illegible] now in common use in commercial fertilizer plants throughout the United States. The merits of these materials as ammoniants of phosphate-carrying fertilizers are not to be denied since they provide an economical source of nitrogen while at the same time they greatly improve the mechanical condition of the mixture. However, it is sometimes alarming to note the laxity and carelessness with which these materials are handled at many plants. It seems well worth while to point out the hazards involved and to recommend a few general suggestions as to their safe handling.

Anhydrous ammonia, containing some 82% nitrogen by weight, is the most concentrated source of available nitrogen used by the fertilizer industry. However, because it is stored and transported as a compressed gas, it requires pressure equipment and a more specialized technique for handling. Its properties should be kept well in mind,—its boiling point is -28°F; at 70°F it exerts a vapor pressure of 114 psig, and at 90°F, a pressure of 166 psig. It volatizes immediately upon release [illegible] worker can [illegible] to 100 ppm [illegible] period. Four hundred ppm cause throat irritation and 700 ppm cause eye irritation, with usually no serious after effects, providing exposure is limited to periods of less than one hour. With slightly greater concentrations exposure is unbearable, with 5,000 to 10,000 ppm usually being fatal.

Commercial grade anhydrous ammonia as used by the fertilizer industry is shipped almost entirely in 11,000 gallon tankcars of I.C.C. specification 105A-300. Cars spotted for unloading should be on a level track, have brakes set, wheels blocked, and regulation blue "Tankcar Connected" signs affixed to the rails. Derails should be placed at one or both ends of the unloading track, approximately one car length from the car being unloaded, unless the car is protected by a closed and locked switch or gate.

After the car is properly spotted and protected, the following safety equipment should be readily available for any and all workers who are to engage in unloading operations:

1. Respiratory equipment, approved by the United States Bureau of Mines and used in strict compliance with the manufacturers instructions. A canister-type industrial full-face mask may be used for gas concentrations 3% and under for a brief exposure period, but if gas concentration exceeds 3%, is unknown or if exposure is prolonged, supplied-air respiratory equipment of proper design with full-face masks and protective clothing should be used. 2. Protective clothing, consisting of felt or treated fibre hats, rubber suits, gloves and shoes, should be available at all times for emergency use. Safety goggles should be worn at all times when handling ammonia. 3. Emergency equipment, consisting of the following, should be located as close as possible to the area where ammonia is being handled.

A. Safety shower of treadle type
B. Bubble-type drinking or eye-wash fountains.
C. Respiratory equipment
D Stretcher and blanket.

Anhydrous ammonia tankcars are equipped with four valves in the dome, working as pairs. The two along the longitudinal axis of the car are the liquid valves and are connected to eduction pipes which ex-

by
H. R. Krueger*

**Director, Technical Service,
Phillips Chemical Company
Bartlesville, Okla.**

* Paper presented at Fertilizer Safety meeting, Stevens Hotel, October 11, 1951.

tend almost to the bottom of the tank, while the two valves across or pointing to the sides of the car are the vapor lines and are connected to short pipes which extend into the vapor space above the liquid. There are some dual purpose tankcars in ammonia service that are equipped with excess flow valves, whose purpose is to shut off immediately the flow in event of a broken or ruptured line between tankcar and storage.

Tankcar connections should be made with ten-ply flexible rubber steam hose, wire braided and armored, with high pressure screw couplings. Since ammonia corrodes copper and some alloys, all pipe, valves, fittings and couplings should be made of extra heavy black iron or designed especially for ammonia service. Only compressors designed for ammonia service should be used.

Storage tanks for anhydrous ammonia should be constructed and tested in accordance with the A.S.M.E. Code for unfired pressure vessels and for the working pressures indicated below:

Paragraphs U-68 and U-69 of the 1946 A.S.M.E. Code	- 200 psig
Paragraphs U-200 and U-201 of the 1949 A.S.M.E. Code	- 250 psig
1950 A.S.M.E. Code	- 250 psig.

Construction in accordance with the A.P.I.-A.S.M.E. Code with a design working pressure of 250 psig is likewise satisfactory. Tanks must be equipped with one or more spring-loaded safety relief valves set at 250 psig pressure with vent pipes directed above and away from working areas. In warm climates, a light shed covering is recommended to afford protection from direct rays of the sun on the storage tank. In very hot locations, the additional protection of cool water sprays over the tank are helpful in keeping vapor pressures low. Tanks should be coated with light-reflecting paints, preferably white or aluminum. All tanks, valves, piping and fittings should be regularly inspected, valves kept in top working condition, with safety valves tested on regular schedules.

Safety Habits

AFTER the installation is properly engineered and all equipment is in top working order, the human element enters the picture. These are the men for whom all the proper equipment and safety devices have been designed. However, if the personnel is not trained in their proper use, the best designed equipment will not prevent accidents. A new operator should never be allowed to handle anhydrous ammonia until he has either been apprenticed to a skilled operator or has been taken step by step through the complete operation by a supervisor. Stress should be placed on disconnecting procedure, which is just as important from the safety standpoint, as the connecting procedure.

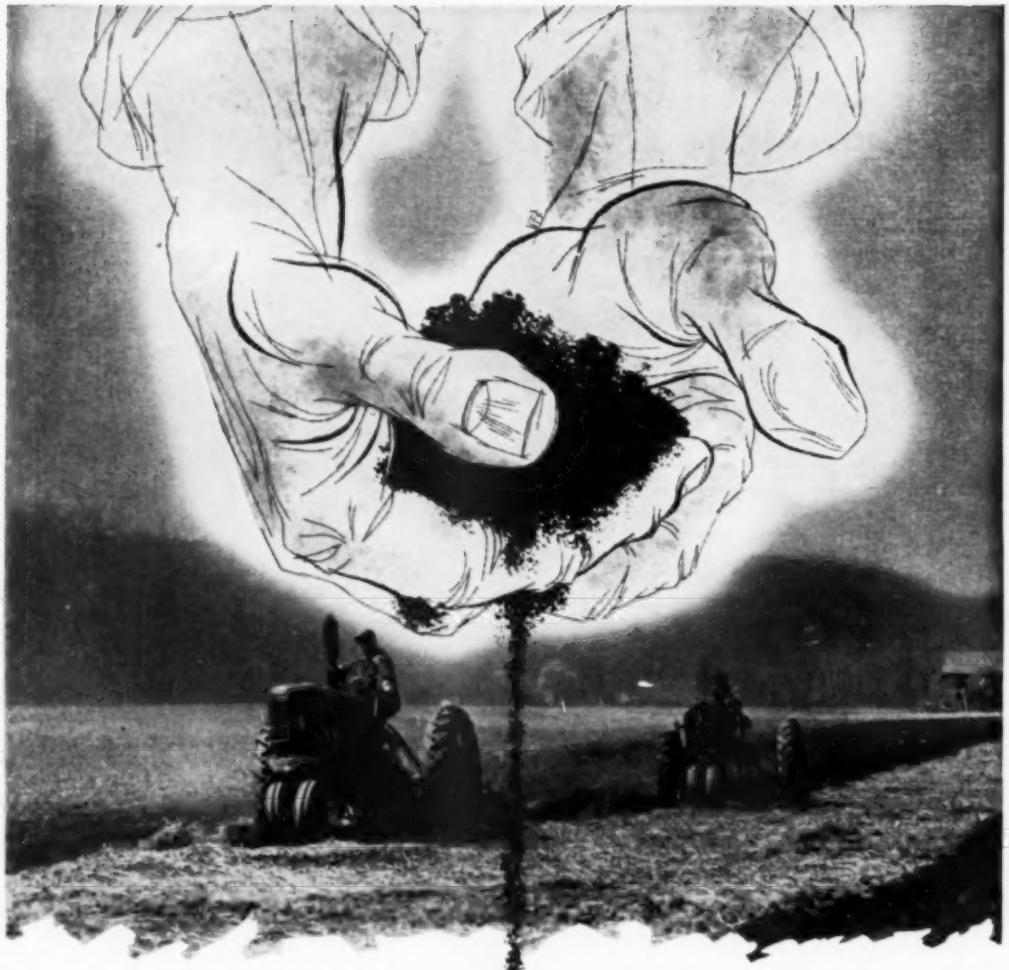
Too much importance can hardly be placed on safety rules and the necessity for strict compliance with them. The careless operator is a hazard, not only to himself but to all others in nearby areas.

Anyone who has anything to do with the handling of anhydrous ammonia should carefully study Chemical Safety Data Sheet SD-8 of the Manufacturing Chemists Association or Pamphlet G-2 of the Compressed Gas Association.

Considerable space has been used to discuss equipment and practices to follow in handling anhydrous ammonia, because the technique and equipment for such handling are more exacting than those required for the other fertilizer ammoniating solutions covered by this paper. The same general precautions should be followed for the other ammoniating solutions, as well as keeping available the same protective equipment.

There are two types of ammoniating solutions made specifically for the fertilizer industry in common usage today. Six nitrogen producers are manufacturing ammonium nitrate fortified solutions containing from 37 to 49% N by weight, with one producer offering a urea ammonia solution containing around 45% N. The vapor pressures at 104°F of these solutions vary from one psig for the 37% solution to 50 psig for the 49% solution, while the urea-ammonia solution, at the same temperature, has a vapor pressure of 50 to 64 psig. The lower pressure of these ammoniating solutions, as compared to anhydrous ammonia, is one of the reasons for their wide acceptance in the fertilizer industry. Due to the high corrosive properties of all of these solutions, most fertilizer plants use compressed air, rather than pumps, to transfer.

(*Turn to page* 111)



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REPRESENTATIVES IN PRINCIPAL CITIES

New York State Conference Presents 3-Day Program on

Insecticides & Fungicides

DISCUSSIONS on pesticide application equipment, results and recommendations of pesticidal materials, and technical papers on insect and plant disease control were all included on the program for the thirteenth annual New York State Insecticide and Fungicide Conference scheduled to be held at Ithaca, N. Y., November 7, 8 & 9. The meeting was to include also the fourth annual Pesticide Application Equipment Conference.

According to the program published in advance of the conference, the program was to include the following topics and speakers.

Prof. O. C. French, Cornell, was to be in charge of the opening program. Nov. 7, with an address of welcome by Cornell president, Deane W. Malott. The following papers were scheduled for the remainder of the morning period:

"Orchard Insect Control with Air Blast Equipment," Dr. E. H. Glass and Dr. S. E. Lienk, Geneva, N. Y., and Dr. A. B. Burrell, Ithaca, N. Y.; "A Flexible Outlet Mist Concentrate Applicator," R. E. Adams and Dr. C. W. Terry, Ithaca, N. Y.; and "Mist Blower Elm Leaf Beetle Control: Timing, Formulations," Dr. J. G. Matthysse and Dan Clower, Ithaca, N. Y.

Following lunch, Dr. C. W. Terry, Cornell, was to be chairman of the afternoon session, with these papers being presented:

"Spreader-Sticker for Mist Concentrate Spraying," Dr. G. L. Mack, Geneva, N. Y.; "Low Gallonage-Low Pressure Spraying for Row Crops," Dr. G. E. R. Hervey, Geneva, N. Y.; "A Concentrate Mist Sprayer for Row Crops," Prof. W. W. Gunkel and Dr. J. L. Brann, Ithaca, N. Y.; "Concentrate Spraying of Grapes," Dr. A. J. Braun, Geneva, N. Y.; "Low Gallonage Spraying for Soil Insect Control," Dr. J. G. Matthysse and Dr. G. G. Gyrisco, Ithaca, N. Y.; "Comments on Use of Concentrates for Orchard Pest Control," Dr. J. L. Brann and Prof. W. W. Gunkel, Ithaca, N. Y.; and "Looking Ahead at Herbicides," Dr. R. D. Sweet, Ithaca, N. Y.

From 5 to 6 in the afternoon, the group was to inspect an exhibit of experimental equipment at the Cornell Animal Husbandry Judging Pavilion, and that evening, the presentation of technical papers was to continue in a session with Prof. French as chairman. These papers were on the evening schedule:

Panel Discussion on Application Equipment Problems from the viewpoint of:

The Processor; Morton Adams, Alton Canning Company, Alton, N. Y.

The Fruit Grower; D. M. Dalrymple, fruit grower and secretary, N.Y.S. Horticultural Society, Lockport, N. Y.

The Vegetable Grower; Marion Johnson, Vegetable and Fruit Grower, Williamson, N. Y. and The Commercial Spray Operator, R. F. Pendleton, Commercial Pesticide Application Service, Ithaca, N. Y.

Dr. G. C. Kent was to be in charge of the morning session, Nov. 8. This part of the program was to include three papers,

"Recent Advances and the Future of Fungicides," Dr. G. L. McNew, managing director, Boyce Thompson Institute, Yonkers, N. Y.; "A Five-Year Projection on Growth of Agricultural Chemicals," E. V. Hart, president, Niagara Chemical Division, Food Machinery and Chemical Corporation, Middleport, N. Y.; and former president of National Agricultural Chemicals Association; "Progress on the Control of Cattle Mange, Poultry Parasites and Houseflies," Dr. H. H. Schwardt and W. J. Goodwin, Jr., Ithaca, N. Y.; "Developments in Drop Control on Apples," Dr. M. B. Hoffman, Ithaca, N. Y.; and "Fruit Insect Research," Dr. E. H. Glass, Geneva, N. Y.

Dr. P. J. Chapman was to be chairman of the afternoon program on Thursday, November 8, which

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was to continue to study on fruit insect research. Papers were to be presented by Dr. E. H. Smith, Dr. S. F. Lienk, Geneva, N. Y.; Dr. E. F. Taschenberg, Fredonia, N. Y.; Dr. R. W. Dean, Poughkeepsie, N. Y.; and Dr. J. E. Dewey, Ithaca.

Recommendations for fruit insect control were to be made by Dr. A. A. LaPlante, Ithaca, N. Y., while Drs. J. M. Hamilton, A. J. Braun, D. H. Palmiter and A. B. Burrell, Ithaca. Dr. W. D. Mills, Ithaca, was to present recommendations for fruit disease control for 1952. The annual banquet was scheduled to be held Thursday evening at the Hotel Ithaca.

Friday's schedule, with the morning session under the chairmanship of Dr. J. M. Hamilton, was to include the following papers:

"Commercial Florist Crops Disease Control," Dr. A. W. Dimock and Dr. L. M. Massey, Ithaca, N. Y.; "Commercial Florist Crops Insect Control," Dr. W. E. Blauvelt, Ithaca, N. Y.; "Nursery Insect Control," Dr. F .L. Gambrell, Geneva, N. Y., and Dr. J. G. Matthysse, Ithaca, N. Y.; "Preliminary Study of Feeding Insecticide Treated Alfalfa to Dairy Cattle," Dr. G. G. Gyrisco, Ithaca, N. Y.; and "Vegetable and Potato Disease Research," Dr. W. T. Schroeder, Geneva, N. Y., Dr. B. Lear and R. C. Cetas, Ithaca, N. Y.

The afternoon Program chairman was to be Dr. C. E. Palm. Papers for presentation included:

"Combined Muckland Vegetable Disease and Insect Control," Dr. A. G. Newhall and Dr. W. A. Rawlins, Ithaca, N. Y.; "Vegetable Disease Control in 1952," Dr. Charles Chupp, Ithaca, N. Y.; "Potato Disease Control Recommendations for 1952," Dr. C. W. Boothroyd, Ithaca, N. Y.; "Vegetable Insect Research," Dr. A. C. Davis, Geneva, N. Y.; Dr. E. F. Taschenberg, Fredonia, N. Y., and Dr. H. C. Huckett, Riverhead, N. Y.; and "Vegetable and Potato Insect Control Recommendations for 1952," Dr. R. W. Leiby, Ithaca, N. Y.

The meetings were to be held in Bibbins Hall, G.L.F. Terrace Hill.

November 15 and 16, Dates Set for annual meeting of

Eastern Branch AAEE

HOTEL New Yorker, New York City was the place for the 23rd annual meeting of the Eastern Branch of the American Association of Economic Entomologists, scheduled to be held November 15 and 16.

Papers listed for presentation included a wide variety of entomological studies, including application of insecticides, reports of experiments with systemic insecticides and other types; and reports of tests with radioactive tracers in biological control of insects.

Among the papers scheduled for delivery were the following, "Control of Peach Insects with Dilute and Concentrated Spray Applications," by Castillo Graham, Hancock, Maryland; "Control of the Pear Borer on Apple," by A. M. Woodside, Staunton, Va.; "Experiments on Pea Aphid Control," L. P. Ditman, College Park, Md.; "Red-Banded Leaf Roller Control Studies, 1951," Edward H. Glass, Division of Entomology, New York State Agricultural Experiment Station, Geneva, N. Y.; and "Control of Several Tree and Shrub Leaf Miners," John G. Matthysse and John A. Naegele, Cornell University, Ithaca, N. Y. The last named authors were also to present another paper on "Spruce Mite and Southern Red Mite Control Experiments."

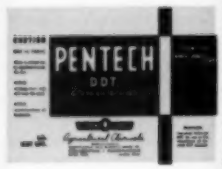
A progress report on "The Response of the Large Milkweed Bug to Sublethal concentrations of DDT and Toxaphene," was to be presented by James McD. Grayson, Agricultural Experiment Station, Blacksburg, Va. Mr. Grayson is co-author with D. G. Cochran and Max Levitan, also of Blacksburg, of another paper on the program. It is entitled, "Relation of the Sex Chromosome to DDT Resistance in the German Cockroach." "Control of the Cattle Mange Mite, *Chorioptes bovis*," is the title of a paper by William J. Goodwin, Department of Entomology, Cornell University.

A report of successful attempts to develop a chemically-defined aseptic medium for rearing houseflies was to be presented in a paper by H. L. House, Dominion Parasite Laboratory, Belleville, Ontario, Canada. An interim report of progress in studies on the use of radiophosphorus in marking insect parasites was also on the agenda for the meeting in a paper, "Notes on the Use of Radioactive Tracers in Biological Control," by W. F. Baldwin, also of the Dominion Parasite Laboratory, Belleville, Ont.

Dr. S. F. Potts, New Haven, Connecticut, was to present a paper describing a new air-blast apparatus for applying insecticides from helicopters. Dr. Potts has developed a number of other types of pesticide applicators for ground use.

Henry H. Richardson, U. S. Department of Agriculture, Hoboken, N. J., was scheduled to present a paper entitled, "Ethylene Dibromide Fumigation of Mangoes for Fruit Fly Quarantine Control." This paper was to describe results of small and large scale tests in Puerto Rico on fly mortality and fruit tolerance.

The group was to elect new officers for 1952. The present officers, named at last November's meeting in Philadelphia, are: F. H. Lathrop, Maine Agricultural Experiment Station, Orono, chairman; Floyd F. Smith, Truck Crop Insect Division of the Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agriculture, Beltsville, Md., vice-chairman and B. F. Driggers, New Jersey Agricultural Experiment Station, New Brunswick, N. J., secretary-treasurer.



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PROGRESSIVE CHEMISTRY FOR OVER A CENTURY

Northwest Conference Held at Yakima for

Aerial Applicators

THE third annual Northwestern Aerial Dusting and Spraying Conference was scheduled to be held at Yakima, Washington, November 7 & 8. The meeting, sponsored by Washington State College, the Washington State Aeronautics Commission and the State Department of Agriculture, was to include on its program, outstanding entomologists, plant pathologists, and aerial applicators.

According to the program arranged in advance of the meeting, the conference was to open on November 7 at the Chinook Hotel, with a talk by C. W. Getzendaner, entomologist, Bureau of Entomology and Plant Quarantine, U.S.D.A., Forest Grove, Oregon. His paper was entitled, "Improvements and Innovations in Aerial Spray and Dust Operations with Special Reference to Control of the Pea Aphid on Canning and Freezing Peas in the Blue Mountain area of Eastern Oregon and Washington."

V. D. Young, agricultural engineer, Bur. of Plant Industry, Soils and Agricultural Engineering, U.S.D.A., Forest Grove, Ore., was to present a paper on research studies on the aerial application of insecticides, followed by John S. Riss, Special Equipment and Aircraft Center, B.E.P.Q., Oklahoma City, Okla., who was to talk on aircraft application equipment.

Control of stone fruit pests by aircraft was the topic to be pursued by E. W. Anthon, Dept. of Entomology, Tree Fruit Experiment Station, Mt. Vernon, Wash. His talk was the final one on the program before lunch, which was to include a speaking program with Charles S. Chester, Seattle, Washington, as master of ceremonies. A speaker from the Civil Aeronautics Authority was to address the group at the noon meeting, with Robert L. Nuber, assistant director of aeronautics, Seattle, as moderator.

The afternoon session was to begin with a talk, "Spruce Budworm Control," by R. L. Furniss, entomologist, B.E.P.Q., Portland, Oregon. This was to be followed by a paper, "Practical Literature on Insect Control," by H. S. Telford, chairman, Department of Entomology, State College of Washington, Pullman.

Roderick Sprague, plant pathologist, Wenatchee, Wash., was to discuss "Disease Control on Tree Fruits," followed by G. F. Fischer, chairman, Dept. of Plant Pathology, State College of Washington, Pullman, presenting a paper on "Principles of Plant Disease Control." A progress report was to be presented by J. Leon Sealey, M.D., acting director, Environmental Research Laboratory, University of Washington, Seattle, and J. Monte Johnston, Sr. Asst. Surgeon and Gordon Batchelor, entomologist, U. S. Public Health Service, Wenatchee, were to appear on the program before it adjourned for the afternoon.

The second day's program was to begin at 9 with a business and organizational meeting of the Washington State Weed Association. L. L. Frederick, chairman, Agricultural Committee, Washington State Aviation Association, Wenatchee, was to be moderator.

At 9:30, the aerial spray and dust conference was to continue, in a session on "Safety Records," with talks by David R. Nelson and E. D. Jacobson. A paper, "Observation on Insecticide Applications to Potatoes," was to be presented by B. J. Landis and Kenneth Gibson, entomologists, B.E.P.Q., Union Gap, Wash. E. P. Breakey, associate entomologist of Western Washington Experiment Station, Puyallup, was to talk on "The Newer Insecticides."

A series of talks on various aspects of insurance and legal angles, was to complete the morning meeting. Tony Winser, aviation manager, Cravens-Dargan & Co., San Francisco, was scheduled to talk on "Uniform Insurance Regulations for the Pacific States;" R. Ross Osborn, insurance adjustor, R. Ross Osborn Co., Spokane, "Claims for 1951;" and Stuart W. Turner, Western Consultants, Seattle, "Legal Aspects of Aerial Applications."

The luncheon on November 8, was to be held jointly with the Washington State Weed Conference at the Commercial hotel. Noontime speaker was scheduled to be Mark T. Buchanan, director, Washington Agricultural Experiment Stations, Pullman, Wash.

Returning to the Chinook hotel for its final meeting, the Conference's afternoon session was to be held with the Washington State Weed Conference, with Auburn Norris, State Weed Supervisor, Yakima, as moderator. Lowell Rasmussen, associate agronomist, Dr. Walter Clare, associate horticulturist; Henry Wolfe, extension weed specialist, State College of Washington, and Mr. Norris, were to form a panel on "Herbicidal Damage and Recommendations for Prevention."

John Wiley, president, Washington Flying Farmers Assn., Prosser, was to address the group, and a four man panel was to discuss "Aerial Application of Herbicides." Taking part in this session were to be Vern St. John, A. J. Anderson, Bob Allison and L. I. Friedrich.

The meeting was to end at 4:30 p.m. with a State Department of Agriculture representative discussing "State Regulations."

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Washington Report

THE exporting of agricultural chemicals and their formulations has been a much-discussed subject of late by the Office of International Trade of the Department of Commerce. This organization is the executive arm of the Federal government insofar as the actual issuance of export licenses are concerned. However, it should be emphasized that OIT issues these regulations only after careful surveys and studies have been made by other Federal agencies as well.

At the present time, the following materials are under positive export control: Technical DDT and formulations of DDT which contain 25% and over of the active ingredient; technical BHC and BHC formulations which contain 1% gamma isomer and above; certain agricultural fungicides which contain the dithiocarbamates as the active ingredient; and certain animal dips.

It is contemplated that many of the other chlorinated hydrocarbon chemicals and certain of their formulations will also be placed under export control soon. Such an order would no doubt include chlordane, toxaphene, aldrin, dieldrin, parathion and similar materials. In addition, copper sulfate is expected to be placed under positive export control.

* * *

O.I.T. explains that the placing of these additional materials under control was necessary to conserve domestic supplies of these materials and to prevent excessive amounts from finding their way into the export market. In carrying out the decisions of the Interdepartmental Committee on Export Controls, O.I.T. may set up country-wide totals or the total amount of material that can be made available for export. There are four types of programs which are established: quantitative, open-end, restricted—which is a partial open-end, and a closed quote. The degree of control depends upon the individual material that is being controlled. It is within the purview of O.I.T. to allocate the material as it sees fit since it is in the best position to take into consideration the various factors that will affect the requirements for the particular material.

With regard to BHC formulations, O.I.T. is generally adopting the policy of letting most exports move rather freely, since moderate surplus exists at this time. However, with regard to BHC formulations that contain sulfur, O.I.T. has taken a much stricter view. This was done more to conserve sulfur than any other material. A tentative policy has been followed, of permitting only those amounts of material which were available for manufacture as of August 15, 1951 to be exported this year. This is obviously done to conserve those supplies of sulfur which were available for the current agricultural year.

The amount of sulfur-containing materials to be available during the coming season for control of cotton insects is difficult to predict at this time. Although there have been definite policies established for the quantity of export sulfur that will be available for the fourth quarter, no decision has yet been made as to the amount of sulfur-bearing cotton dusts for which permission will be given for export. However, it is thought that some allowances will be made for these types of materials to be shipped to other friendly nations. O.I.T. follows the policy of handling exports of a critical material on the same basis as they are handling domestic—that is, when a material is allocated in the U. S. for specific end use control, that same policy is followed for export control. However, it is easy to see where O.I.T. may have difficulty in practicing the conservation of sulfur for the coming season for exports.

* * *

With regard to DDT, O.I.T. has been working on the general assumption that 20 million pounds, on the basis of technical DDT, will be made available in the fiscal year from July 1, 1951 to June 30, 1952. NPA, E.C.A. and O.I.T. are trying to get as many of these exports as possible out of the way in the first six months of the fiscal year in order to reduce interference with the domestic agricultural consuming season. There are of course many difficulties with this type of procedure since export licenses are good for a period of three months after they have been issued, and it is sometimes difficult for exporters to arrange the shipping, obtain the necessary currency and the multitude of other details necessary for export shipments. Then too, it is difficult for O.I.T. on the basis of its present setup to be sure each and every export license actually has been exercised in its entirety in the period for which it is allowed. For example, to date it is generally considered that about 10 million pounds has been authorized for export, but it is impossible to predict whether these 10 million pounds will actually be shipped within the 3 month period for which they have been allocated.

Also, in the case of DDT and DDT formulations, these materials are produced in other countries. However, many foreign customers have been turning to the U.S. for their supplies since prices are generally lower and formulations better.

O.I.T. has for the most part tried to take care of specialized programs which have been sponsored by the Economic Cooperation Administration and other specialized government and quasi-government agencies sponsoring agricultural and public health programs in various countries. This has worked a hardship against private exporters to some extent but this agency tried to solve this problem by use of a past pattern of shipments for private exporters wherever possible. Should a particular country's quota be over-subscribed, then O.I.T. will follow a historical pattern and allow small quantities to be shipped. In addition, a small amount is always reserved for each country to be used by newcomers into the business. This is done on the theory that O.I.T. does not wish to stifle normal commerce and tries to enable the American exporter to establish some kind of a foothold even under conditions of critical shortages and supply. When necessary, O.I.T. also has the power to request DO assistance from N.P.A. to assure obtaining necessary supplies to fulfill the obligations which it has extended in granting an export license.

* * *

With regard to copper sulfate, the shortage of copper throughout the world has forced importing coun-

Methods of Formulating

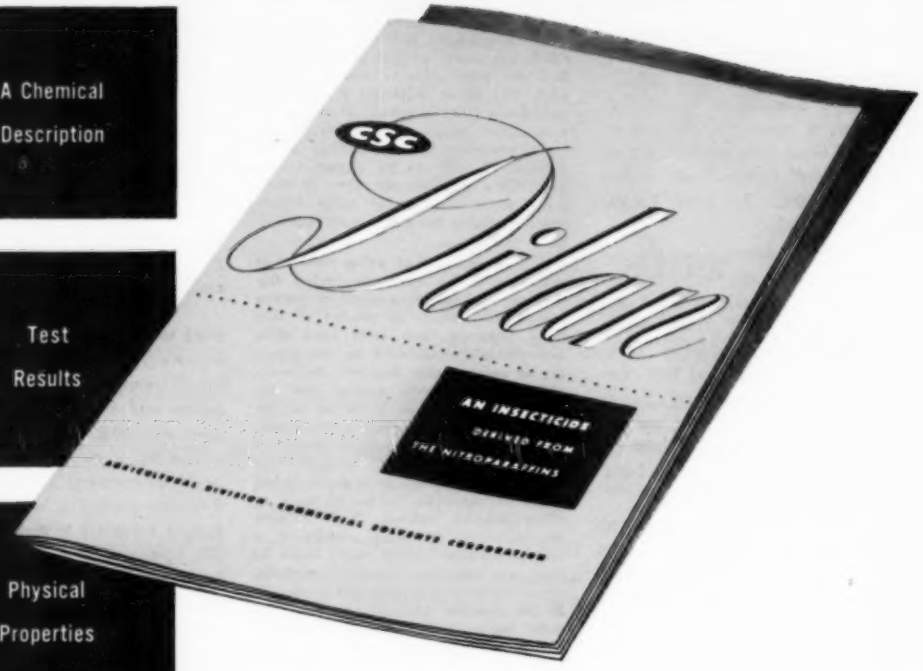
Suggested Spray and Dust Uses

Control of the Mexican Bean Beetle & Potato Leaf Hopper

A Chemical Description

Test Results

Physical Properties



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tries to go anyplace in the world in order to secure their requirements of copper sulfate. Normally, U. S. exporters have been shipping to specific countries, particularly in Central and South America. However, it is known in the trade that because of the general shortage of copper and copper-containing products, many countries who do not normally obtain copper sulfate from the U. S. are now obtaining these larger supplies. Trade channels know, for example, that both Argentina and France which normally do not obtain copper sulfate from the U. S., are actually receiving material at this time. Positive export control will eliminate this to a great extent and will tend to preserve the past pattern of export shipments that have normally been followed by a domestic exporter. It is regarded generally as a wise and logical type of policy to follow and it is expected that most industry people will agree with this type of positive approach.

In spite of a very short market in copper sulfate, figures available from government sources have already indicated that exports have been increased by some 20-25% per month. In addition, copper sulfate is being shipped from the U. S. to many countries in much greater volume then they have normally been obtained from this country in the past. In some instances, copper sulfate, as was mentioned above, is actually being shipped to countries that did not normally depend upon the U. S. for their supplies.

As would appear logical, O. I.T. must follow the same pattern that is followed by U. S. civilian control agencies. One difficulty, however, is that time may cause hardship since the setting up of the necessary controls and all of the paper work necessary to the export control programs may sometimes require many months. By the time the actual policy may be put into effect, the supply position may have changed considerably so that shortages may turn into surplus materials. Then it is necessary for O.I.T. to go back through the Interdepartmental Committee to have the various changes made. However, patience and tolerance on the part of the industry are the watchwords under these conditions.

* * *

The chemical industry was startled early in October by the issuance of Direction 3 to NPA Regulation 2 which dealt with restrictions upon the issuance of priority ratings for chemicals. No DO's were to be applied or extended to obtain any basic organic or inorganic chemicals or intermediates and derivatives other than compounded end products not customarily sold as chemicals unless such rating was one that was issued by the armed forces or by the Atomic Energy Commission. The restrictions did not affect the status of DO's applied or extended prior to the effective date, September 25, 1951.

In instances where a definite hardship could be shown, N.P.A. has the power to extend a DO-21 rating which could only be issued after each individual case has been very thoroughly investigated

* * *

Critical raw material problems of supplies affecting the agricultural insecticide industry for the coming year continue to be benzene, chlorine, lead for the manufacture of lead arsenate, copper for the manufacture of copper chemicals, and the problem of obtaining sufficient steel containers for shipping and storage of various raw materials and finished pesticides.

NPA has stated it will make steel available for drums for the products of the agricultural chemical industry only if the members of the industry will require the return of these drums for re-use. This, of course, poses many serious problems, not least of which is the effect of drum deposit charges insofar as prices are concerned under the current provision of OPS.

In addition, there are many products which do not lend themselves to be packaged in second-hand or returned drums. Notable among these are 2,4-D formulations. However, it appears to be the intent of the authorities in NPA to force the hand of the agricultural chemical industry into the use of the second-hand containers. Unless the steel situation improves considerably, the industry is going to be faced with some grave problems in this matter.

* * *

The Interdepartmental Committee on Pest Control composed of representatives of the Department of Agriculture, Interior and Defense and the Federal Security Agency, recently issued a statement on the health hazard of thermal generators as used for the control of flying insects. Most industry spokesmen believe that this statement of policy was quite fair but were surprised that the Committee was as liberal in allowing these units to be used. The statement pointed out that it is the considered opinion of the "Interdepartmental Committee that there is at present no data to indicate that the use of thermal generators dispensing only lindane, DDT or mixtures of the two for a control of flying insects is unsafe" when certain specific restrictions are enforced. The restrictions had to do with the rate of use, the method of installation and where these devices are used. Specifically, the devices were recommended as not being safe to use in homes or sleeping quarters. The statement also gave directions as to the mounting of the units above head height as well as lowering from the ceiling.

* * *

An N.P.A. Industry Advisory meeting of herbicide and defoliant producers was scheduled for the latter part of October. Producers of 2,4-D, 2,4,5-T, arsenical weed killers, chlorate weed killers, and the newer cotton defoliants were scheduled to discuss with the representatives of the Chemicals Division of N.P.A. Department of Agriculture and other Federal agencies, the supply and outlook for the various chemicals used in this field. In general, supplies of 2,4-D and 2,4,5-T would be limited by the amounts of phenol and chlorine that were made available for use in the manufacture of these materials. Chlorates would be limited by the amount of this chemical that could be diverted from direct and indirect military uses. Cotton defoliants in general, will be available in about the same degree as they were available in the 1950-51 season.

* * *

The Defense Production Administration presented a program which would stiffen the controls on

Black Leaf ELIABLE, DEPENDABLE PEST CONTROL PRODUCTS

The famous Black Leaf® trademark is the tried and trusted friend of millions of Americans. For more than 40 years it has been the symbol of quality and dependability to farmers, stockmen, fruit and vegetable growers, florists and home gardeners. Here are some old and some new members of the big family of Black Leaf pest control products:

Aldrin: Black Leaf Aldrin Dusts are available in various formulations: 2½% Aldrin, 2½-5-0 (with 5% DDT), 2½-10-0 (with 10% DDT), 2½-5-40 (with 5% DDT and 40% Sulphur), and 2½-10-40 (with 10% DDT and 40% Sulphur). These dusts control boll weevils, bollworms, leaf worms, thrips and similar insects infesting cotton. Black Leaf Aldrin Emulsifiable Concentrate is produced containing 2 pounds of Aldrin per gallon for spraying cotton to control boll weevils, thrips and grasshoppers.

Arsenate of Lead: Black Leaf Arsenate of Lead is a standard, high-quality Lead Arsenate for control of chewing insects in accordance with state recommendations.

Benzene Hexachloride: Black Leaf 3-5-40, containing 3% gamma isomer of Benzene Hexachloride, 5% DDT and 40% Sulphur is widely used on cotton for control of boll weevils, bollworms, thrips, aphids and similar insects. Also available without Sulphur (3-5-0), and with 10% DDT (3-10-40 or 3-10-0).

Calcium Arsenate: Black Leaf Calcium Arsenate is a standard product, especially suited for dusting cotton to control boll weevils and certain other insects, and for use wherever Calcium Arsenate is recommended for dusting or spraying.

Chlordane: Black Leaf 72% Chlordane Emulsifiable Concentrate is a high-quality product for control of ants, roaches, flies, or similar insects . . . and also for control of soil-infesting insects, such as wireworms, Japanese beetle larvae, etc. Other formulations of Chlordane, such as 45% emulsion, 40% dust base and 40% wettable powder, are available.

DDT: Black Leaf 50% DDT Wettable Powder is recommended for control of insects on fruits, vegetables, field crops, etc. Black Leaf 25% DDT Emulsifiable Concentrate is formulated to meet exacting requirements for control of bollworms on cotton, and is generally suitable for spraying crops for which DDT emulsifiable concentrates are recommended. Black Leaf 10% DDT and 5% DDT Dusts are widely used for the control of insects infesting vegetable and field crops and for the control of cotton bollworms. Formulated on a special tobacco material carrier, Black Leaf 10% DDT Dust makes an excellent product for use on tobacco.

DDT/Parathion: Black Leaf 253 is a combination of 25% of DDT and 3% of Parathion, formulated on a special tobacco material carrier. This highly-effective product controls codling moth, leafhoppers, red-banded leafroller, certain scale insects and mites infesting apples, grapes and similar fruits. This combination offers a high degree of efficiency and economy when used in the second cover spray and subsequent applications as recommended by local authorities.

Dieldrin: Black Leaf Dieldrin Emulsifiable Concentrates are formulated especially for use on cotton, to control boll weevils, thrips and similar insects, and provide long-lasting effectiveness.

Nicotine Products (Nicotine Sulphate, Nicotine Alkaloid, and Fixed Nicotine): The famous Black Leaf 40 and Black Leaf 99 are the recommended forms of Nicotine for use in controlling aphids and similar soft-bodied sucking insects infesting fruits, vegetables and field crops, by spraying or dusting — and Black Leaf 155 (Fixed Nicotine) is the recommended form of Nicotine for spraying fruits to control codling moth and similar insects, its use being particularly desirable during the latter part of the season to avoid undesirable residues at harvest. Made by the world's largest manufacturers of Nicotine insecticides.

Parathion: Black Leaf 15% Parathion Wettable Powder (Dustless) is formulated on a special tobacco material carrier to eliminate the hazardous dustiness of this important new insecticide. The Dustless feature is an extra safeguard.

Sulphur Dusts: Black Leaf Dusts, combining Sulphur, Copper and DDT, are recommended for control of leafspot, leafhoppers and certain other insects and diseases attacking peanuts.

TEPP: Black Leaf Vapo-Fume® 40, containing 40% of tetraethyl pyrophosphate, has special utility in the control of mites and certain other insects. Conveniently packed in 1-gallon containers — and in larger containers for remanufacturing purposes. This product is quick-acting and highly effective, leaving no undesirable residues. Precautions should be observed in handling, as with all phosphatic insecticide materials.

Toxaphene: Black Leaf Toxaphene Emulsifiable Concentrates — widely used to control bollworms, boll weevils and similar insects infesting cotton — are formulated to contain 4, 6, or 8 pounds of Toxaphene per gallon. Also used for controlling spittle bugs, grasshoppers and other insects which require extra killing power. Other Black Leaf Toxaphene products are: 40% wettable powder suitable for spraying; 20% dusts (with and without Sulphur); and 40% concentrate for manufacturing dusts.

Weed Killers: Black Leaf 2,4-D Amine Weed Killer and Black Leaf 2,4-D Ester Weed Killer are available in Midwestern and Northwestern grain-producing areas for control of noxious weeds and certain other plants infesting grain crops.

For House and Garden Use: In addition to the products listed above, the Black Leaf family includes pest control products conveniently packaged for house and garden use, such as: Black Leaf 40®, Black Leaf Aerosol Insect Killer, Black Leaf Arsenate of Lead, Black Leaf 1.00% Rotenone Dust, Black Leaf 50% DDT Wettable Powder, Black Leaf Garden Dust, Black Leaf 5% Chlordane Dust, Black Leaf Warfarin Rat and Mouse Killer Concentrate and Black Leaf Warfarin Rat and Mouse Killer Mixed Bait.

Every Black Leaf pest control product is attractively packaged and carries full directions. If you desire additional information, communicate with the address below. Your inquiry will receive prompt attention.

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sulfur. This limited program was issued early in October and provided for the following points:

1) Use of sulfur for the production of sulfuric acid and carbon disulfide will be limited to 90% of each plant's use during 1950. Adjustments will be made for plants supplying sulfuric acid to the vital industries.

2) Use of carbon disulfide for the production of cellulose film will be limited to 90% of each plant's 1950 rate.

3) Use of sulfuric acid will be limited to 90% of last year's rate for each plant producing aluminum sulfate for uses other than public water treatments; synthetic detergents for other than industrial uses, lead, zinc and titanium pigments for paints, dyes; cellulose film; rayon; sulfonated oils for textile finishing; tall oil for recovery of minerals and in some paints and soaps; textile finishing and phosphate fertilizers.

The regulations further provided that other restrictions may be issued from time to time on users of sulfur and sulfuric acid and carbon disulfide where study shows that reduced consumption of these materials would not affect the plant's production. This latter provision was designed to encourage conservation and increased use of substitutes.

* * *

Meanwhile, the Office of International Trade announced 4th quarter export quotas for sulfuur which provided for 240,000 long tons of crude sulfur and for 7500 long tons of refined sulfur. The crude sulfur quota represents a 10,000 ton cut from that established for the 3rd quarter while the refined quota is unchanged.

It is of interest to know that combined the two sulfur quotas represent approximately 18% of the current estimated rate of U. S. sulfur production. This compares with annual U. S. sulfur exports since 1935 of about 20% of production, except in the years 1939, 1946 and 1949 when they averaged about 26%. Thus in the year 1951, a total of 970,000 long tons of crude sulfur and 30,000 long tons of refined and other processed sulfur were made available for export. This represents a reduction of 11% from the total 1950 sulfur exports which amounted to 1,124,000 tons.

* * *

The Department of Agriculture is planning to continue the cooperative economic insect reports for the coming year. To weigh future policy in the cooperative effort, a special meeting will be held in Cincinnati during December to make plans for the cooperative surveys for the coming year. The meeting was called by the Bureau of Entomology & Plant Quarantine and will feature speeches by both Federal and State authorities who are engaged in this effort.

* * *

In line with the necessity of conserving sulfur in every possible way, a number of manufacturers are reported to be accelerating work on non-sulfur pesticides for applications where sulfur was formerly used. Naugatuck Chemcal Division of U. S. Rubber Co., for example, is marketing its dichloronaphthaquinone product, "Phygon" for apple scab and brown rot of peaches to replace wettable sulfur. Where from six to eight pounds of sulfur were required for control, less than a pound of the synthetic product is required.

For control of cotton mites, the product "Aramite" is being offered to save from 30 to 40 pounds of sulfur per acre. About a quarter pound of "Aramite" technical per acre is required for control, the company states. For "complete clean-up," an additional third of a pound is recommended. The chemical formula of "Aramite" is Beta-chloroethyl beta-(p-tertiary butyl phenoxy)-alpha-methylethyl sulfite.

NPA announced on October 31st a delay of "not more than 30 days" before it actually issues the three orders limiting the uses of sulfur, sulfuric acid and carbon disulfide. Originally the orders were to have become effective November 1st, but due to industry's complaints that it was not adequately consulted, the delay was provided in order to allow time for reconsideration. Meantime, a special eight man committee of producers and sulfur users has been formed to review the proposed orders and recommend changes.

Cotton Conference Nov. 8

Improved methods of cotton insecticide application were to be studied at the National Cotton Council's fifth annual Beltwide Cotton Mechanization Conference at Chickasha, Okla., November 8-9, according to Dr. C. R. Sayre, general chairman of the conference.

Stressing the importance of effective pest control as a means of increasing cotton yields, Dr. Sayre said that this year in some parts of the Belt, producers had combined early season insecticide application with cultivation of the crop.

Combination of the two operations, effecting savings in labor and costs, was credited by the Cotton Council official to the development of spray insecticides. Sprayers and cultivators are mounted on the same tractor, with the complete operation being performed by one man.

"This innovation represents another advance in the cotton mechanization program," Dr. Sayre said. "It is a step forward in the cotton industry's goal of increased efficiency and increased productivity per man."

Dr. Sayre described improvements in the insect control program as being outstanding, pointing out that in 1950, cotton farmers used more than 500 million pounds of insecticides, whereas ten years earlier they had used little more than 40 million pounds.

Insecticide application and other cultural practices will be discussed at the Mechanization Conference by a panel of authorities representing the farm equipment industry, the agricultural experiment stations and educational agencies.

The Chickasha meeting, expected to attract more than 500 leaders in cotton mechanization work from 25 states, is sponsored by the Cotton Council in cooperation with the Farm Equipment Institute, the land grant colleges of the cotton states, vocational agriculture, the U. S. Department of Agriculture, and the major farm organizations. Oklahoma A. & M. College will serve as host to the 1951 meeting.

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New Books . . .

Beet-Sugar Technology, edited by R. A. McGinnis, Spreckels Sugar Company, Woodland, California, 574 pages published by Reinhold Publishing Corp., New York, N. Y., illustrated with charts, diagrams and photographs, cloth binding, price $10.00.

The book, written by various contributing authors, covers the beet sugar industry from growing of the beets to purification and crystallization of the sugar. While mainly concerned with production of beet sugar in the factory, a chapter of the book covers the growing of sugar beets in the field. There are short discussions of pre-emergence weed treatment and late emergence weeds by chemicals, application of fertilizers and control of insects and diseases.

•

Industrial Chemicals by W. L. Faith, Donald B. Keyes and Ronald L. Clark. Published by John Wiley & Sons, Inc., New York. 652 pages, 6 x 9 inches, cloth binding, price $8.00.

Essential technical and economic data for 106 major commercial chemicals are compiled in this text. Each chemical is discussed separately, covering: the name and chemical formula, manufacturing processes in current use; equations for the principal reactions involved and average yield expectations; raw material requirements; a production chart for the past 20 years; price chart for the past 20 years; general use table; miscellaneous data including physical properties, commercial grades, shipping regulations; and economic aspects.

Among the compounds covererd in the book are: ammonia; ammonium nitrate; ammonium sulfate; carbon tetrachloride; chloral; DDT, 2,4-D, diphenylamine; ferrous sulfate; lime; nitric acid; hydrochloric acid; sodium carbonate; sodium phosphate; sodium silicate; and sulfuric acid and urea.

•

Science and the Land, the 71st annual report covering 1949-50 for the New Jersey Agricultural Experiment Station, Rutgers University, New Brunswick, contains 167 pages. The bulletin covers most phases of experimental work and is presented in question and answer form.

•

Annual Report of the Director, Experimental Farms Services, Department of Agriculture, Ottowa, Canada, the year ending March 21, 1950. The report covers most of the experimental work being done by the experimental farms.

•

The Peanut, The Unpredictable Legume, a symposium, published by the National Fertilizer Association, Washington, D. C., 333 pages, illustrated with charts, diagrams and photographs, cloth binding.

This book, written by specialists in their fields, covers the peanut as a crop from its economic importance and origin through cultural practices, diseases and insect pests to morphology and physiology of the plant. Each section has been written by a different author who compiled all the data available and reached a consolidation and interpretation of present-day ideas.

Chapters in the book cover such phases as soil properties, which include soil types peanuts are grown on and experiments done on fertilization of the crop. Cultural practices cover fertilizer applications and chemical seed treatment. Chapters on insect pests and their control, which include velvetbean caterpillar, fall armyworms, corn earworm, potato leafhopper, white-fringed beetle and others, and plant diseases, which include pre-emergence diseases, post-emergence damping-off, dry rots, collar rot, leafspot, Southern root rot and virus diseases are presented in order of their importance to the plant. Diseases are divided into groups according to the period when they attack the plant, pre-emergence or during growth or maturity of the plant.

The book is well illustrated, easy reading as facts are straight forward and not over-burdened by many technical descriptions. The book covers the field thoroughly and, while a basic biological background helps, it is not necessary for complete understanding. Many selected references are given for further reading on all topics.

•

Herbert H. Dow, Pioneer in Creative Chemistry, by Murray Campbell and Harrison Hatton; published by Appleton-Century-Crofts, Inc., New York; 168 pages, 37 illustrations cloth bound; Price $3.50.

This is a well-written story of the life and early struggles of Herbert H. Dow and the Dow Chemical Company which for forty years were synonymous. For ten years in the early history of the company, failure followed failure, but Dow never quit. That the monument which he built in the chemical industry has grown greatly since his death in 1930 is to the credit of those who followed. But Herbert Dow laid the foundation of one of the greatest chemical enterprises in the world.

Born in Canada, but of old New England stock, young Dow attended Case School of Applied Science in Cleveland where the family had moved. He wanted to be an architect, but settled for chemistry because he received a free scholarship at Case. His early ventures in the manufacture of bromine and bromide from brine were not successful financially. In 1897, he formed the Dow Chemical Co. at Midland, Mich. after seven years of genuine financial distress. Success was slow and marked by bitter competitive battles with the Germans and English.

Over 50 years ago, Herbert Dow was a pioneer in the practical

(*Turn to page* 111)

Sulfuric acid for the free world

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At your request . . . and without cost or obligation to you or your company . . . a Monsanto engineer will bring you full details. Write, wire or 'phone MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

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Monsanto Vanadium Catalyst, produced solely for use in the manufacture of sulfuric acid by the contact method, is highly efficient, rugged, long-lasting. It is used in Monsanto-designed plants in these countries: United States, Canada, Mexico, Cuba, Trinidad, Curacao, N. W. I., Argentina, Brazil, Chile, Peru, United Kingdom, Holland, France, Spain, Italy, Turkey, Egypt, Palestine, Iraq, Iran, India, Sumatra, Borneo, Australia, Japan.

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Suppliers' Bulletins

Aldrin Booklet Issued

An eight-page brochure on aldrin has been issued by Julius Hyman & Co., Denver, Colo. Entitled, "Aldrin, man's new hope for conquering the locust," the illustrated booklet shows photos of recent locust control in Iran when 13 tons of the material were sent to that country by plane early this year; also accounts of other applications of the insecticide in Canada, the U. S., South America and India-Pakistan. Statistical information is also given regarding economies affected by using aldrin; methods and time of aldrin action; the material's toxicity, and technical information. Write Julius Hyman & Co., Denver, Colorado, for copies of the booklet.

•

Hammer Mill Bulletin

A new catalog describing its line of hammer-type mills has been published by Raymond Pulverizer Division of Combustion Engineering-Superheater, Inc., Chicago. The "Imp Mill" model is said to produce fine, uniform materials, well adapted for dusting operations, and the air separation system allows cooler operation for fewer shutdowns. Write for Catalog No. 68, Raymond Pulverizer Div., 1314 N. Branch St., Chicago 22, Ill.

•

2 Pennsalt Bulletins

Pennsylvania Salt Manufacturing Company's Agricultural Chemicals department has issued two bulletins on control of insects on livestock.

No. 204, "How to Control Flies and Other Livestock Pests with Lindane," lists in chart form the host animal, pests which may be controlled with the material, the recommended concentrations and suggestions for application. A wettable powder containing 25% lindane is recommended by the U. S. Department of Agriculture for control of flies and certain other insects.

No. 205, "How to Control Insect Pests on Livestock," is similar to No. 204 in its chart presentation but gives alternate treatments with BHC, DDT or lindane, and suggested combinations of them to be used in controlling a long list of pests common to livestock.

Both bulletins unfold to fit a standard 8½" x 11" ring binder. They are available on request by writing Pennsalt Mfg. Co., Agricultural Chemicals Department, 1000 Widener Building, Philadelphia, Pa.

•

Offers Emulsifier Data

Literature on the product "Toximul," an emulsifier for agricultural insecticides, has been prepared by Ninol Laboratories, Chicago. The material features spontaneous dispersion when used in toxaphene emulsion concentrates and forms stable emulsions with little agitation, the company states. Write for information on "Toximul" emulsifiers, Ninol Laboratories, Dept. A, 1719 S. Clinton St., Chicago 16.

•

Bag Packing Literature

H. L. Stoker Co., Claremont, Calif., has published descriptive literature on its two models of bag packers. One model is engineered for bagging a wide variety of granulated or powdered materials such as fertilizers, and the other for dry insecticides. Information about applications, construction and specifications is printed on separate sheets enclosed in a folder for easy filing. Write the company for copies of the literature.

•

Fertilizer Booklet Out

International Minerals & Chemical Corp., Chicago, has prepared a booklet, "Fertilizer Food for Plants," to give the user a better understanding of the function of plant food. The book is divided into five sections: the introduction (describing terminology and other definitions); sources of plant food, major plant foods; secondary plant foods and fertilizer use.

Written in simple language for the layman, the book does a comprehensive job of translating the fertilizer trade to the dealer and user of such materials. It is available from the I. M. C. Corp., 20 N. Wacker Drive, Chicago, 6, Ill.

•

Attaclay Folder Produced

Attapulgus Clay Co., Philadelphia, has prepared a brochure of data on its line of "Attaclay" carriers and diluents as a handy reference guide. The information is enclosed in a folder to fit in the standard file for easy reference. The company states that it will prepare subsequent bulletins containing information on classification of diluent materials, their use with pesticides etc., to be sent to interested persons. Write Attapulgus Clay Co., Dept. P, 210 W. Washington Square, Philadelphia, 5, Pa.

•

Hough Issues Booklet

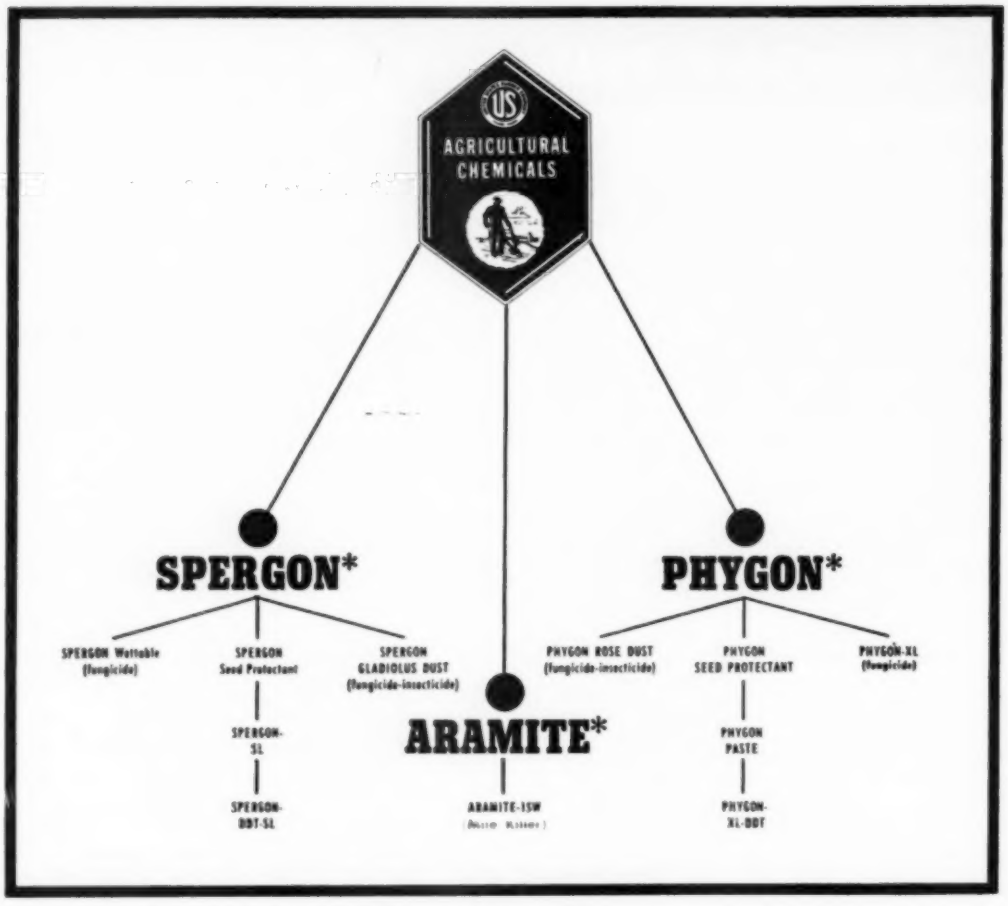
A new booklet describing its line of equipment for materials handling has been prepared by The Frank G. Hough Co., Libertyville, Ill. The 16-page lithographed brochure pictures use of the "Payloader" in a number of industries, including a complete story of its operations in a fertilizer plant. Write for copy of "Industrial Handling," care of the company.

•

New Warfarin Booklet

A 16-page, two-color, illustrated booklet describing "Rax Powder," has just been published by the manufacturer, Prentiss Drug & Chemical Co., Inc., 110 William St., New York 38, N. Y.

Prentiss Warfarin Concentrate is used for the preparation of ready-to-use baits and rodenticides. The new booklet gives all the facts about the rodenticide—from its discovery in the laboratories of the University of Wisconsin, through its testing and to its final use.



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The Listening Post

Fungicides for Use in Emergencies

This department, which reviews current plant disease and insect control problems, is a regular monthly feature of AGRICULTURAL CHEMICALS. The comments on current plant disease problems are based on observations submitted by collaborators of the Plant Disease Survey Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture, Beltsville, Md.

By Paul R. Miller

PROTECTION of the country's crops against the attack of plant diseases is an essential part of an effective national defense program. The Plant Disease Survey's warning service, with which readers of *Agricultural Chemicals* are already familiar, is the basis of the plan for a State and Federal detecting and information system.

When a threatening situation requiring chemical control is discovered, proper fungicides must be available without delay. The warning service recognizes the importance of keeping the fungicide industry informed about sorts of chemicals most likely to be needed and the places where demand is most urgent. The service's warning letters are relayed to the industry by arranging with the National Agricultural Chemicals Association. This alert cooperation is all the more necessary in an emergency period, since supply of chemicals for fungicides may be limited and must be utilized to utmost advantage.

Following is the "Proposal for Strengthening the Plant Disease Survey in the United States Through Cooperation of State and Federal Agencies, with Particular Emphasis on Protection Against Serious Crop Diseases," as it was submitted by the Bureau of Plant Industry, Soils, and Agricultural Engineering to the various States.

Full production of American agriculture is essential during the current emergency to provide a maximum of food, feed, fiber, and other commodities. This requires control of all hazards, including crop diseases. The introduction of new plant diseases or the spread of old ones into new areas could cause serious damage. Early recognition and prompt initiation of control measures can reduce damage from such diseases to a minimum and permit the most efficient use of fungicides and equipment, either of which may be in short supply during an emergency.

The problem of crop protection is of national concern and is the joint responsibility of State and Federal agricultural agencies. In recognition of the need for more adequate staff and facilities for detection and identification of crop diseases, the Bureau of Plant Industry, Soils, and Agricultural Engineering requested additional funds under a Civil Defense appropriation. It has been determined that such additional funds will not be made available, which means that procedures for the early detection of serious crop diseases must be developed within currently available resources. Careful consideration has been given to adjustments that might be made to provide reasonably sound protection against unusual crop disease threats and at the same time permit maximum continuation of current important research and service programs. The following suggestions are offered as a basis for developing a cooperative State-Federal program that should meet these requirements within the resources collectively available:

Chart I

Teamwork for Controlling Plant Diseases

Federal Participation

THE Plant Disease Survey unit has for several years conducted a warning service for specific diseases in the Northeast, North Central, and Southern regions of the United States. The warning service programs developed in these regions could provide the nucleus for the development of a more intensified program covering these areas. The pathologists employed by the Bureau and located within each region can be made available to assist with the development of individual State programs, and the rapid interchange of pertinent information within the region. It is hoped that a pathologist can be provided in the near future to service the Western region similarly.

The Bureau will plan to provide at Beltsville, Maryland the herbarium, laboratory, greenhouse, and library facilities required to identify such unusual or obscure causes of plant diseases as may be forwarded by cooperating State pathologists. Such facilities and personnel will be limited, so the amount of material to be handled promptly will also be limited. It is expected that only those specimens which for one reason or another cannot be identified or accurately checked at the State level will be forwarded to the Bureau headquarters, as shown in the accompanying chart.

A third and possibly most im-

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portant service that can be provided by the Bureau is the assembling and prompt distribution of information regarding important disease developments. The warning letter, now dealing only with specific diseases, will be utilized to report all currently important information. *The Plant Disease Reporter* also will be maintained and distributed in its present form.

In addition to the warning letter and *The Plant Disease Reporter*, illustrative background and educational material, including lists of plant diseases for which special watch should be maintained and other pertinent information, will be issued periodically in *The Plant Disease Courier*.

State Participation

IT is recognized that each State is responsible for organizing its own facilities, including scientific personnel, extension and other educational services, county agents, civil defense representatives, and other workers who can assist in an effective system of local volunteer observation. It is appreciated also that farmers are in the best strategic position to find and observe plant disease outbreaks, and to call them to the attention of local officials. The Civil Defense Administration has issued several general bulletins advising farmers to watch for unfamiliar signs in their crops and to report them along with specimens to their county agents. A similar bulletin on the specific topic of animal diseases and crop pests will soon be issued by the Civil Defense Administration.

There are many pathologists in the State Agricultural Experiment Stations or other State laboratories who are recognized as outstanding authorities on some special group of pathogens. It is hoped that such individuals can be utilized as expert consultants to assist with disease specimens in their special fields that could not be identified by persons less familiar with that group of pathogens without prolonged study. Only unusual or otherwise important specimens should be referred to such

(*Turn to page 95*)

Reports on the Insect Situation

This column, reviewing current insect control programs, is a regular feature of AGRICULTURAL CHEMICALS. Mr. Dorward is connected with the department of Insect Pest Survey and Information, Agricultural Research Administration, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington. His observations are based on latest reports from collaborators in the U.S.D.A.'s pest surveys throughout the United States.

By Kelvin Dorward

EUROPEAN corn borer larvae have been taken in Morrill and Scotts Bluff counties, Nebraska. This constitutes the first record of the insect in the panhandle section of that State. Reports from Maine state that European corn borer infestation was higher this year in the southern part of that State than in 1950 but was light to moderate in the remainder of the State. The second-brood was lighter in Massachusetts than usual. In a recent press release, the *Lydella* fly, an introduced parasite of the European corn borer, is credited with reducing the corn borer population 40 to 60 percent in many of the infested areas of the United States. The fall army worm was the outstanding insect pest in South Carolina in September, causing damage to alfalfa, soybeans, Bermuda grass, fescue, and other pasture plants. Other States reporting damage from the fall army worm were Louisiana, Texas, Kentucky, Mississippi, and Nebraska. The velvetbean caterpillar was responsible for defoliation of soybeans, cowpeas and kudzu at Baton Rouge, Louisiana. Some other insects causing damage to cereal and forage crops included corn leaf aphid on sweet corn in Utah, English grain aphid in Montana, wheat joint worm in Montana, and the pea aphid on alfalfa in Wisconsin and Utah.

Vegetable Insects

HEAVY Mexican bean beetle infestations were reported from Florida, Georgia, Delaware and Virginia. The corn ear worm was reported as damaging beans in Tennessee, beans and peppers in Delaware, sweet corn in the Yakima Valley of Washington, tomatoes in Ohio and southern California, and field peas in Tennessee. Damage to beans was being caused by the salt-marsh caterpillar in Delaware and California and to lettuce and other vegetable crops in the Salt River Valley of Arizona. Other vegetable insects causing damage were bean thrips in Utah, potato leaf hopper to beans in Ohio, the lesser cornstalk borer to snap beans and soybeans in South Carolina and beans and peas in Florida. The pepper weevil was reported as causing damage to peppers in Massachusetts and hornworms to tomatoes in Virginia, Mississippi, and South Carolina.

Cotton Insects

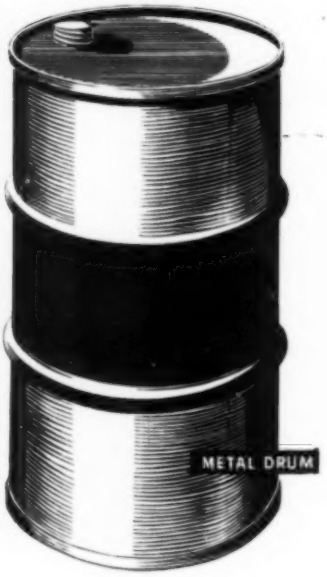
ALTHOUGH boll weevils were not the problem in 1951 as in 1950, late September rains in many localities made conditions favorable for weevils and it is expected that there will be an increase in the population that will go into hibernation. The cotton leaf worm was sufficiently abundant in localized areas of the West Texas Plains section to warrant control during late September. Boll worms caused damage to late maturing cotton in Virginia, destroyed squares in the Shreveport district of Louisiana and injured cotton in localized areas in Arizona. Heavy infestations of the salt-marsh caterpillar occurred on cotton in the Mesa and Marinette districts of Maricopa County, Arizona.

Fruit Insects

THE third-brood of the red-banded leaf roller caused severe damage in a few northeastern Ohio orchards during the last week in Sep-

PROTECTION—

. . . . against contamination and damage



The purple band identifies 2,4-D and 2,4,5-T drums

An industry-sponsored program of marking "hormone-type" weed killer drums to prevent accidental mis-use or contamination of other agricultural chemicals when the drums are re-used. A voluntary action by industry to aid the defense effort. Color chips are available from the National Agricultural Chemicals Association.

NATIONAL AGRICULTURAL CHEMICALS ASSOCIATION

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tember. The yellow-necked caterpillar was sufficiently injurious to apples in Frederick and Washington Counties, Maryland, to necessitate phosphorus sprays in September. Localized infestations were severe in Tennessee. The apple maggot caused serious injury to Bartlett pears at Marlboro, Middlesex County, Massachusetts and was much more prevalent on apples in the State than usual. Some other fruit insects reported as causing damage were apple aphid in southern Maine, peach silver mite in the Wenatchee district of Washington and plant bugs in peach orchards in Ohio.

Insecticides Studied

THREE recent USDA releases from the Bureau of Entomology and Plant Quarantine contain information of considerable entomological interest.

Technical Bulletin No. 1034, "Effect on Truck Crops of DDT Applied to the Foliage," is by C. E. Weigel, BEPQ; A. C. Foster, BPI-SAE and R. H. Carter, BEPQ. This deals with field experiments to determine the direct effects of DDT on the plant growth and crop yield when applied to the foliage of various vegetable crops. Studies were also made to determine whether any of the DDT applied to the foliage is absorbed and translocated to the edible portions of the plant. The experiments were conducted at Beltsville, Maryland, from 1945 through 1948. The strengths and dosages of the DDT sprays and dusts and the number of applications were the maximum believed to be necessary for the seasonal control of the susceptible insect pests of the crops tested. It was found that DDT caused no injury to Bountiful snap beans, Detroit Dark Red beet, Golden Acre cabbage, Hale's Best cantaloup, Abbott and Cobb cucumber, Ebenezer onion, Alaska and Thomas Laxton peas, Hubbard Winter squash, Katahdin and Sebago potatoes, and Purple Top White Globe turnip. DDT caused temporary foliage injury to Rutgers and Marglobe tomatoes, Irish Cobbler potato, Stringless Green Pod snap bean, and Fordhook lima bean, but did not affect the yields of these crops. DDT stunted the growth of Early Yellow Crookneck squash and reduced the yield. Chemical analyses of the edible portions of the crops indicated that there was no absorption or translocation of DDT by the vegetables under the conditions of these experiments.

Leaflet No. 226, by J. C. Elmore and Roy E. Campbell, BEPQ, "Pepper Weevil," states that sanitation is the most important control measure that can be employed against the pepper weevil. The leaflet further states that the pepper weevil may also be controlled by dusting the plants with 5 percent DDT or with cryolite containing 50 percent of sodium fluoaluminate. DDT is the more effective. Apply DDT every 10 days or cryolite every 7 days until most of the pods have matured, and if the infestation is very heavy make the first three applications at shorter intervals, 7 days for DDT or 5 days for cryolite. In Florida cryolite has been reported to cause some injury to the foliage and buds of pepper.

The use of DDT or cryolite on pepper plants may cause large numbers of aphids, or plant lice, to develop, especially when the weather is favorable to them early in the season. Aphids can be controlled with a 4-percent nicotine, 1-percent parathion, or 1-percent rotenone dust. A dust containing 5 percent of DDT and 1 percent of parathion has given good control of both pepper weevils and aphids.

Both DDT and cryolite leave poisonous residues, which must be removed before the peppers are dried or offered for sale. The following recommendation is made for washing: Agitate for 1 minute in a 2-percent hydrochloric acid solution heated to 100° F. to remove cryolite residues, and in water containing a detergent washing powder (1 pound to 50 gallons) to remove DDT residues. Rinse thoroughly in clean water. Samples of the pods should be chemically analyzed frequently to make sure that the poison is being removed successfully.

Leaflet No. 308 "Control of Lice and Sheep Ticks on Sheep and Goats," was prepared by the Division of Insects Affecting Man and Animals, BEPQ; and the Zoological Division, BAI. The following extract is a general summary of the leaflet: "Rotenone—containing insecticides will control the sheep tick and are economical. They are also effective against lice on sheep and goats. Several new insecticides—including DDT, TDE, methoxychlor, benzene hexachloride, lindane, toxaphene, and chlordane—have recently been developed which are excellent for controlling lice on goats and the sheep tick. They have not yet been tested extensively against lice on sheep. However, it is believed that they will prove equally effective when used at the same strengths. To control the foot louse, however, higher concentrations will be required. This species lives on the sheep's foot, where the wool is short and insecticides are easily rubbed or washed off.

Formerly control of lice and sheep ticks was accomplished by use of dips containing rotenone, sulfur, creosote, arsenicals, or nicotine. With the exception of rotenone, these materials are being replaced by the new insecticides mentioned above. With the development of these highly effective materials there has been increasing interest in sprays for treating the animals. If the concentration is high enough and the spray is properly applied and timed, good practical control can be obtained. If facilities for dipping cannot be provided, sprays and in some cases dusts may be applied.★★

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duPont Reduces Prices

E. I. duPont de Nemours & Co., Inc., Wilmington, Del. recently announced price reductions on its "Marlate" methoxychlor insecticides and the "EPN-300" insecticide. Reductions listed for the various formulations and package sizes involved average about 11½% on the basis of carlot deliveries, the company states.

An All Out Effort to Meet Demand for Nitrogen

Phillips is producing nitrogen fertilizer materials at full capacity. But even our tremendous rate of production isn't always sufficient to meet today's demand. We'll do our best for you. Keep us in mind if you need nitrogen in any form.

AMMONIUM SULFATE—Phillips*66* Ammonium Sulfate is a free-flowing 21% nitrogen material! Mixes easily! Uniform crystals resist caking! Ideal for high-analysis mixed goods! A fine direct application material!

AMMONIUM NITRATE—Phillips*66* Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Phillips*66* Prilled Ammonium Nitrate can be depended on for uniform, free-flowing properties and top-notch crop response.

NITROGEN SOLUTIONS—More N per dollar! Phillips *66* Nitrogen Solutions are well suited to the preparation of high-analysis fertilizers and the ammoniation of superphosphate. These three nitrogen solutions keep handling costs low . . . promote rapid, thorough curing!

ANHYDROUS AMMONIA—Tank car shipments of Anhydrous Ammonia (82% nitrogen) go out to Phillips contract customers from Phillips production facilities in the Texas Panhandle. Write our nearest district office for full information.

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Technical Briefs

How 2,4-D Leaves Soil

The rates of disappearance of 2,4-D and 2,4,5-T were studied under field conditions. Plots were treated in 1949 with these compounds at rates of 0.0, 0.2, 1.0 and 2.5 mg per square yard. These plots were treated in 1950 at a rate of 1.0 mg per square yard. In 1950 2,4-D disappeared more rapidly from plots in which it had decomposed in 1949 than from previously untreated plots. The persistence of 2,4,5-T was not influenced by previous treatment. 2,4-D persisted 4 and 5 weeks, respectively, in plots which had and had not been treated previously. 2,4,5-T persisted more than 19 weeks.

Studies on the activity of the population responsible for the decomposition of 2,4-D in various soil horizons of Frankstown silt loam were made under laboratory conditions. The lag period before onset of decomposition and the time for complete decomposition were appreciably longer for the subsurface horizons than for the surface horizons.

—"*Disappearance of 2,4-Dichlorophenoxyacetic Acid and 2,4,5-Trichlorophenoxyacetic Acid from Soil.*" A. S. Newman, J. R. Thomas and R. L. Walker, Camp Detrick Chemical Corps, at American Society of Agronomy, State College, Pa.

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Sprays for Peach Disease

Fall applications of dilute and concentrated air-blast copper sprays for the control of Coryneum blight leaf curl in peaches have been tested during the past two years. The more dilute sprays (100 to 400 gal./acre) were applied with sprayers that delivered either 27,000 or 40,000 cu. ft. of air per min.; the concentrated sprays (25 to 75 gal./acre) were applied with a machine that delivered 16,000 cu. ft. When equivalent amounts of copper were applied per acre, copper deposits obtained on twigs with the air-blast applications of basic copper sulfate plus an oil adhesive were as high as or higher than those obtained with the same materials or Bordeaux mixture applied with a hydraulic sprayer. Basic copper sulfate with a sticker appeared to adhere slightly better than Bordeaux mixture without an adhesive. The control of leaf curl and Coryneum blight obtained with air-blast applications of either basic copper sulfate or Bordeaux was as effective as that obtained with the same materials applied as dilute hydraulic sprays. Disease control obtained with air-blast applications at 25 gal. per acre was not improved by increasing the adhesive from 0.1 to 0.3 gal. per lb. of copper sulfate.

—Summary of "Low Volume Sprays for Peach Disease," by Harley English and E. E. Wilson, before Pacific Division, APS, Los Angeles, Calif.

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Texas Fertilizer Tests

Experiments were conducted during 1950 on a farm at Pecos, Texas, to determine the fertilizer needs of the soil in that area. Yield increases were found to result from application of ammonium nitrate, but little or no yield increase resulted from application of either phosphate or potash.

The application of 179 pounds of ammonium nitrate (60 pounds N) increased the yield of seed cotton 228 pounds per acre. Applications of additional nitrogen gave only a slight additional increase in yield. The application of nitrogen delayed maturity somewhat.

Mixtures of nitrogen and phosphorus or nitrogen and potash showed no advantage over nitrogen applied alone.

Since this was the first fertilizer test conducted in the area, the authors stated that additional tests are necessary before definite recommendations can be made. — Progress Report No. 1400, Texas A & M College, College Station, Texas. By P. D. Christensen, J. J. Bayles and P. J. Lyerly.

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Discuss Fungi, Insects

Arasan, Fermate, and Spergon have been found to be more suitable for the treatment of wounded tissues than fungicides containing mercury or copper.

The nature of the fungistatic effects of a number of chelating agents has been established at Saanichton. Cupferron and phenolthiourea acetic acid have been shown to be effective fungistatic agents in themselves and have been used in the synthesis of two fungicides that have proved to be more effective than Arasan, a very popular commercial fungicide.

Cupferron and phenylthiohydantoic acid were more effective in inhibiting growth than inhibiting respiration, which probably explains why they are fungistatic rather than fungicidal. Various studies indicated that the greatest respiratory effect was exerted during the period of active cell growth. When mercury complexes of these compounds were used inhibition of respiration was greater and this tended to increase the fungicidal action.

The relative stability constants of cupferron metal complexes were found to be in the following decreasing order: Cu>Zn>Fe>Mg>Hg —the same order as reported for other chelates. This order is important in explaining and predicting the fungicidal activity of chelate metal complexes.

The iron and zinc salts of dimethyl dithiocarbamate (Fermate and Zerlate) were found to liberate carbon disulphide and they are effective fungicides. The corresponding copper complex did not liberate carbon disulphide and is not an effective fungicide. Members of the ethylene series of dithiocarbamates, such as Dithane and Parzate, decomposed with evolution of hydrogen sulphide and a small amount of carbon disulphide.

Insecticides

Spray Residues.—Apples of known history and sampled at har-

HERE'S THE ANSWER TO YOUR SPREADING PROBLEMS!

AGAIN! "The NEW LEADER" leads the field

Commercial Fertilizer Attachment Hood—Two Sizes: 19-foot or 23-foot

with its new "Motor-Driven Spreader" offering greater accuracy of spread with the most positive feed on the market!

SPECIAL ADVANTAGES — Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low, super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of the truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9′, 11′, 13′ and 15′. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7′-5″.

"The NEW LEADER" Self-Unloading Bulk Transport

The 20-ton capacity transport above is shown with elevator in place and ready to load a NEW LEADER Spreader truck. These units are proving very profitable; in bad weather they eliminate demurrage on railroad cars; fertilizer gets to the job quickly and spreader trucks can be kept working in the field. The transport, being a self-unloading unit, leaves the tractor truck free to return to pick up another transport load. These units have four individual compartments of 5 tons each. Each compartment may be unloaded independently of the others. Compartments and rear endgate are removable so that bagged and packaged goods may be hauled instead of bulk loads. Capacity 5 tons to 25 tons, lengths from 11 ft. to 40 ft. Written warranty with all NEW LEADER equipment. Write today for specifications, prices, etc. Fast delivery service sells fertilizer!

FREE! Write for "The Story of a Custom Fertilizer Spreading Service"

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS

vest from commercial orchards in the Annapolis Valley carried spray residues below the suggested or permitted tolerances. The spray programs had involved the use of one or more of the following pesticides: methoxychlor, DDT, ferbam, parathion, lead arsenate or bordeaux mixture with calcium arsenate.

DDT in the Soil.—Analysis of soil in sod orchard that had received heavy application of DDT in the past three years showed that practically all the residual DDT was located in the turf surface. No DDT was found below the 2" depth. Turf samples contained up to 100 parts per million and growing grass up to 49 parts per million. There was no apparent effect on grass growth.

Parathion Smoke Generators.—The parathion residue on cucumbers from a greenhouse which had been given a single treatment with a parathion smoke generator was well below the tentative tolerance. One possible feature of danger in the use of such generators is that a compound similar to parathion, but 50 times more toxic to mammals, may be generated by the heat. This possibility is being investigated.

Parathion Absorption Studies.—Oat plants growing on parathion-treated soil contained 2.4 parts per million of parathion (fresh weight basis) after 45 days' growth and 0.4 parts per million after 80 days. Parathion in the soil decreased about 80 per cent in 80 days under greenhouse conditions.

Studies on Toxicity.—Toxicity of the new insecticides to warm-blooded animals continues to be a major study. It is essential to know what effect these may have on livestock as well as on man.

—From report of Canadian Minister of Agriculture for year ended March 31, 1951.

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Fungicides for Fruit Rot

Botryosphaeria ribis (*Dothiorella sp.*) causes a severe rot of avocado fruit from coastal southern California plantings. The fungus enters while fruit are still on the tree but rot develops only when the fruit begins to soften, by which time fruit has reached market or consumer. Spray trials over the past 4 years have shown that the disease can be controlled by two applications of Bordeaux, Crag Potato Fungicide 658, Bioquin 1, or Parzate. In trials in 1950-1951, with randomized treatments replicated 5 times, the percentage of fruit developing rot in various treatments following picking in January and in March respectively were: Bordeaux (two sprays, Sept. 20 and Nov. 1), 4 and 10; 658 (two sprays), 2 and 11; Bioquin 1 (two sprays), 4 and 40; 658 (one spray, Sept. 20), 12 and 38; and unsprayed, 62 and 83. In general, 658 is the most satisfactory material because of the degree of control and the inconspicuous residue. Attempts to control the disease by killing the fungus after it has entered the fruit have been uniformly unsuccessful. Treatments included: paper wrappers impregnated with fungicides (azochloramide, alpha terpineol, 8-hydroxyquinoline sulfate); fungicidal dips (alpha terpineol, tetramethylthiuram-disulfide, 8-hydroxyquinoline benzoate, Dithane D14, Puratized Agricultural Spray); fumigation with ethylene oxide, propylene oxide, hydrogen sulfide, nitrogen trichloride; and heat treatments (hot water and hot, humid air).

—Summary of "Fungicides for Control of Avacado Fruit Rot," by Div., APS, Los Angeles, Calif.

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Tobacco Weed Control

Field studies were conducted in tobacco plant beds on Norfolk, Bladen and Chesterfield soils in which 31 different chemical treatments were tested on 16 weed species. The chemical treatments were applied to 1-square yard plots in which large numbers of weed seeds of each species were sown in October.

The main objectives were to investigate the possibility of interactions between certain weed species and chemical treatments, to develop a practice for spring use which would be suitable for the control of specific weeds, and to determine the residual effects of chemical treatments on the germination and growth of tobacco plant beds.

The major results of this study reported on a square yard basis are summarized as follows:

(1) A definite chemical treatment-species interaction was evident at each location. This study served to emphasize further the fact that different weed species, especially in the seedling stage, respond differently to various chemical treatments. For example, allyl alcohol gave a high degree of control of all weed species except Jerusalem oak (*Chenopodium botrys*) on three soil types.

(2) A combination treatment containing urea, calcium cyanamide, superphosphate, and sulfate of potash showed promise as a fall treatment.

(3) The addition of 12.5 grams of the sodium or amine salt of 2,4-D (acid equivalent) with ½ pound of Cyanamid was effective in controlling leguminous weeds on each soil type.

(4) Methyl bromide and allyl alcohol, with toxicity periods in the soil of 48 hours and 14 days, respectively, showed promise as spring treatments of the three soil types. Methyl bromide gave a high degree of control on all weed species at each location with no toxicity in tobacco.

(5) The fall and spring applications of 4 ounces of sodium azide (NaN_3) and the spring application of 25 c.c. of methyl bromide (1 pound per 100 square feet) on a Norfolk soil eradicated Bermudagrass (*Cynodon dactylon*) in the rhizome and stolon stage. Both allyl alcohol (57 c.c.) and the spring application of 2,4-D (25 grams) gave effective but not complete control of Bermudagrass.

—Summary of paper "*Chemical Weed Control in Tobacco Plant Beds*," by G. D. Hill, G. C. Klingman and W. G. Woltz, North Carolina Agricultural Experiment Station, Raleigh, N. C.

BUMPER COTTON CROPS BANK ON BHC*

America needs more bumper crops . . . especially cotton from which is made thousands of items essential to the defense program such as uniforms, gun covers, tents, sea bags. Benzene Hexachloride has put the boll weevil on his back thus helping to insure bumper cotton crops. Tennessee produces large quantities of this chemical for the dust and spray insecticides that save cotton crops from weevils and other pests. We can't control the weather but we can be sure that weevils won't get out of hand . . . thanks to BHC.*

Bumper crops benefit everyone. And though you probably don't realize it, there are many ways in which your daily life is made more secure, comfortable and convenient through products from Tennessee . . . an industry serving all industry.

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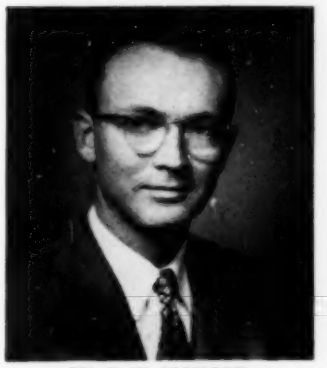
INDUSTRY NEWS

McMillan Named by CSC

A new Production Development and Quality Control Division has been established in the Production Department of Commercial Solvents Corporation; it has been announced by Maynard C. Wheeler, vice-president. Dr. Graham W. McMillan has been appointed manager of the newly created division, with headquarters in Terre Haute, Ind.



DR. G. W. McMILLAN

Dr. McMillan, who received his doctorate at the University of Illinois, joined the Research Department of Commercial Solvents in 1940 and was transferred to the Production Department in 1946.

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Hercules Names O'Neill

Hercules Powder Company has announced the appointment of Paul A. O'Neill as St. Louis sales representative for the company's Naval Stores Department. He will replace Joseph M. Carbonara, who has been transferred to the Export Department in Wilmington to handle sales of Hercules products in Cuba, Venezuela, Mexico, and Colombia.

In his new assignment, Mr. O'Neill will supervise the sale of such Hercules products as rosin and terpene chemicals, turpentine, and toxaphene in the St. Louis territory. He studied chemistry at Drexel Institute of Technology, Philadelphia, and has been associated with the Naval Stores Department of Hercules in Wilmington since 1931. Mr. Carbonara, a graduate of Fordham University, has been a member of the Hercules Naval Stores sales staff since 1939.

E. Milton Regier will replace Mr. O'Neill. Mr. Regier has been associated with Hercules since 1941.

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Cotton Insect Conference

The fifth annual Cotton Insect Control Conference will be held at the Hotel Peabody in Memphis, Tuesday and Wednesday, December 4-5, the National Cotton Council has announced.

This meeting, sponsored by the Council, will bring together research and educational leaders from land grant colleges, U. S. Department of Agriculture, agricultural chemical manufacturing concerns and the cotton industry.

Objective of the conference is to launch an integrated and coordinated program of cotton insect control. This effort is designed to reduce pest damage amounting to more than $200 million dollars annually and which some years reduces the total yield as much as 25%.

Significant results of recent cotton insect control research will be discussed during the two-day sessions, providing material for educational leaders to incorporate into programs at the farm level.

Government and agricultural chemical industry officials are scheduled to discuss the supply situation for recommended insecticides and equipment to control cotton pests.

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Jahr Heart Victim

Richard E. Jahr, 52, died October 18, following a heart attack. He was secretary-treasurer of Standard Chemical Products, Inc., and Standard Agricultural Chemicals, Inc., both of Hoboken, N. J.

G. W. Poland Joins Sergeant

George W. Poland, Jr., for the past 15 years with Stauffer Chemical Co., has been made vice-president of E. M. Sergeant Pulp & Chemical Co., Inc., New York, and president of its New Jersey subsidiary, Sergeant Chemical Co., Newark. The firm has been a distributor of industrial chemicals for 84 years.

GEORGE W. POLAND

Mr. Poland was assistant sales manager for Stauffer Chemical Co., a position he had held for some years. Before his connection with Stauffer, he had been with the American Agricultural Chemical Corporation. He resides in Chatham, N. J., and in addition to taking part in civic affairs, is a member of the Board of Directors of the Salesmen's Association of the American Chemical Industry.

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New Oklahoma Co-op Plant

Construction on a $250,000 acidulation unit to produce superphosphate has been announced by the Muskogee, Oklahoma, Co-op. The new unit will be in addition to the fertilizer mixing plant which has been in operation for the past three years. The new unit is expected to be ready for the spring season. Soil tests made by the U. S. Extension Service indicate that 90% of the soil in the area is deficient in phosphate.

Thurston Opens New Office in Missouri

Thurston Chemical Co. Joplin, Mo. has opened new general offices in Joplin to handle administration of the company's "Bem Brand" fertilizer plants located in Joplin, Tulsa, Oklahoma, and Lawrence, Kansas. These plants serve six midwestern states.

The new office building, pictured above, has 8,640 square feet of floor space. Fifty persons are employed in the general offices at present, the company states.

Canadian Weed Meet Set

The fifth Western Weed Control Conference is scheduled to be held in the Hotel Vancouver, Vancouver, B. C., Canada, November 27 and 28. According to H. E. Wood, editor of Agricultural Publications for the Manitoba Department of Agriculture and Immigration, Winnipeg, the program will include discussions on the effect of chemicals on crops and also their effect on weeds. H. R. Bowman, minister of Agriculture, province of British Columbia, will address the group on the opening day.

Wednesday morning's program will include a discussion on the effect of chemicals on wheat, oats, barley, flax, legumes, vegetables and small fruits. The afternoon session will study the effect of chemicals on animals and common perennial weeds, persistent perennials, weedy grasses, woody brush and pasture weeds.

Discussions of weeds on range lands and weed control in forage seed crops are also scheduled for the first afternoon. That evening, a banquet is to be held with a guest speaker, F. L. Timmons, coordinator, Federal Weed Control Research, Utah State College.

Mr. Woods will be chairman of the Wednesday morning session which has scheduled the presentation of papers on weed control in canning crops (peas, corn and strawberries); Control of toad flax and wild oats; "The Effect of 2,4-D and Associated Substances on Plant Enzymes;" utilization of weed screenings, and new chemicals and new control methods.

The afternoon session of November 28 will feature topics such as "Use of 2,4-D," a review of application machinery, committee reports and conference recommendations.

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Pangborn "Open House"

The Pangborn Corp., Hagerstown, Md., held an open house recently, during which townspeople and families of employees inspected the plant on guided tours. The company manufactures blast cleaning and dust control equipment which was demonstrated to the visitors during the tour.

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New Foundation at Calif.

Announcement of a $2,268,000 M. Theodore Kearney Foundation for studies in soil science, has been made by the University of California. The new foundation will be endowed with proceeds of the bequest of Mr. Kearney, prominent rancher in the Fresno area, who died in 1906.

The foundation will be devoted to the advancement of knowledge of soil science, including soil-water-plant relations, through basic physical, chemical, biological and hydrological research, with particular reference to arid and semi-arid farming regions.

The Kearney Foundation will be administered by a director within the present framework of the Univ. of Calif. College of Agriculture. Eventually, additional scientists will be added to round out the program of soil investigations, the University says.

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A-W Opens Midwest Office

Ashcraft-Wilkinson Company Atlanta, Georgia, exclusive sales agents for the Duval Sulphur & Potash Company, has opened a branch office in Columbus, Ohio, with headquarters in the Atlas Building, 8 East Long street.

Warren C. Huff will be manager of the Columbus office. Mr. Huff has worked as agricultural extension specialist in New York State for several years. Since 1942, he has been connected with the Coke Oven Ammonia Research Bureau, Inc., working primarily with the fertilizer industry and experiment stations in the midwestern and northeastern states. Mr. Huff is active in the American Society of Agronomy and the Soil Conservation Society and currently holds key positions in these organizations.

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Chemical Exposition in NY

The 23rd Exposition of Chemical Industries is to be held at Grand Central Palace, New York, November 26 to December 1, it has been announced. The exposition will feature exhibits of raw, partially manufactured and finished chemical materials and materials of construction. Every phase of chemical industry is to be covered, the preliminary announcements stated. Attendance will be limited to chemists, chemical and mechanical engineers, scientists, members of research groups, research institutions, schools, and others associated with the chemical industry. The general public is to be "rigidly excluded," it was announced.

Jameson Forms Company

A. R. Jameson, until recently first vice-president of Velsicol Corp., Chicago, recently announced the formation of his own firm, Jameson

A. R. JAMESON

Chemical Co., with offices at 218 East Huron St., Chiçago 11. The new firm is supplying on a national scale chemical raw materials manufactured to specification.

Sales manager as well as vice-president of Velsicol for the past 12 years, Mr. Jameson was associated with that firm from September, 1935, until his resignation last month. Previously, he spent a number of years with the Pure Oil Co.

A graduate of Defiance (Ohio) College, Mr. Jameson took post graduate work at Purdue University. He holds membership in the American Chemical Society, Society of Professional Engineers and Surveyors, State of Ohio, the New York Chemists Club and the Chicago Drug and Chemical Association.

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To Represent Talc Co.

Kraft Chemical Co., Chicago, has been appointed exclusive representative for Loomis Talc in Illinois, Indiana and the St. Louis, Mo. area. The firm will handle the material in carload and L.C.L. lots.

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Nebraska Weed Meeting

The sixth annual Nebraska State Weed Conference, Chemical and Equipment Show will be held January 3 and 4 at the 4-H building on the State Fair Grounds, Lincoln, according to Dwight W. Lambert, chief of the Division of Noxious Weeds.

A speaking program is being planned for the first day and the morning of the second day, with a banquet scheduled for the night of January 3. Displays by chemical and equipment manufacturers will be held in connection, Mr. Lambert said.

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Southern Office for Pitt

Pittsburgh Agricultural Chemical Co. has announced the opening of a new office in Charlotte, N. C., to cover a sales territory including the states of North and South Carolina, Georgia, Alabama, Eastern Tennessee and Virginia. In charge of the new office, located at 216 W. Second Street, is Howard Elmer who joined the company in 1950. He is a graduate of Kansas State College, Manhattan, where he majored in entomology.

MEETINGS

National Fertilizer Association Fall Meeting. Atlanta Biltmore Hotel. Atlanta, Ga., November 12-14.

Eastern Branch. AAEE. New Yorker Hotel. New York. Nov. 15 & 16.

Western Weed Control Conference Vancouver Hotel. Vancouver. B. C., November 27-28

Combined meetings of American Association of Economic Entomologists: Entomological Society of America: American Phytopathological Society; and the Potato Association, Netherland Plaza Hotel, Cincinnati, Ohio. Dec. 9-13.

North Central Weed Control Conference. Biltmore Hotel. Oklahoma City, Okla., December 11-13.

Northeastern States Weed Control Conference. New Yorker Hotel. New York City. Jan. 2, 3 & 4.

Sixth Annual Nebraska State Weed Conference & Chemical Show. Lincoln. Nebr., January 3 & 4

11th Annual Meeting. Northwest Vegetable Insect Conference. Imperial Hotel. Portland. Oregon. January 21-23, 1952.

Association of Southern Agricultural Workers. Atlanta Biltmore Hotel. Atlanta, Ga., February 4-6, 1952.

Western Weed Control Conference. Mapes Hotel. Reno, Nevada. February 5-7, 1952

Southern Weed Control Conference (Following Southern Agri. Workers meeting). Biltmore Hotel. Atlanta, Ga., February 6-8

Fincher to Quaker Oats

Robert K. Fincher has been appointed assistant general manager of the Memphis chemical plant of The Quaker Oats Company accord-

ROBERT K. FINCHER

ing to Dr. Homer R. Duffey, manager of the firm's chemical division.

Mr. Fincher, who has been acting as assistant plant manager since July 1, joined The Quaker Oats Company as manager of the engineering department of the Memphis chemical plant in 1946. This plant produces furfural, from the processing of agricultural wastes such as corn cobs.

•

Offers Ag Aviation Course

An agricultural aviation flight and ground school course is being offered by Central Aircraft Inc., Yakima, Washington for the months of November, December, January and February. This course, according to A. L. Baxter, president of Central Aircraft, is a step toward alleviating the current shortage of agricultural pilots, decreasing the accident rate, and stepping up the standards of performance.

Students may enroll in the course at the first of December, January or February. The course covers a period of from 20 days to a month. Eligible, are C.A.A. Commercial license holders, with a minimum of 500 total hours, of which at least 50 hours must have been in craft of 200 HP or more. Cost of the entire course is put at $500.

LION provides one-stop nitrogen service to Southern fertilizer manufacturers

Lion Anhydrous Ammonia — Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

Lion Aqua Ammonia — This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lion Nitrogen Fertilizer Solutions — Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer — The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

Lion Sulphate of Ammonia — This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

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Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking . . . just write.

LION OIL COMPANY

Chemical Division • El Dorado, Arkansas

Calif. Fertilizer Association to Fresno

THE 28th annual convention of the California Fertilizer Association was being held at the Californian Hotel, Fresno, Calif., as this issue of *Agricultural Chemicals* went to press. The meeting dates, November 1-3, were to be well-filled with talks by prominent agriculturists, scientists and Association officials; committee meetings and entertainment for guests.

CFA president James M. Quinn was to call the meeting to order, followed by Sidney H. Bierly, CFA executive secretary and manager, Los Angeles, who was to make a brief address. Gordon G. Dunn, Mayor of Fresno, was on the program to welcome the group.

Dr. Arnold H. Joyal, president, Fresno State College, was to speak on "The New Agricultural Look of Fresno State College" to complete the morning's activities.

Following lunch, held jointly with the Fresno Kiwanis Club, the group was to hear Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C., in a talk entitled, "Break the Bank." CFA president Quinn was next on the schedule, with an address, "Yesterday, Today and Tomorrow."

A symposium on the fertilizer supply situation was to be one of the high points on the November 1 afternoon program. Taking part on the symposium were Earl Willis, sales manager, Pacific Coast Division, Barrett & Co., San Francisco; Ralph Waltz, manager, Fertilizer Department, Wilson & George Mayer & Co., San Francisco; David B. Scott, American Potash & Chemical Co., Los Angeles, and Ned Lewis, Wilbur-Ellis Co., Los Angeles. That evening, the National Fertilizer Association was to present its colored motion picture, "Deeper Acres."

Friday morning's meeting was to be a Bureau of Chemistry session, with Allen B. Lemmon, chief of the Bureau, making his report of the year jointly with Robert Z. Rollins, assistant chief. Charles V. Dick, chief, Division of Plant Industry, California Department of Agriculture, was to tell the functions of his division. A description of the Los Angeles

DR. A. H. JOYAL

Hyperion Activated Sludge Plant was to be presented by G. A. Parks, chief engineer, Hyperion Plant, Los Angeles. Completing this portion of the program, Dr. J. van Overbeek, head of the Plant Physiology Department, Shell Chemical Corp., Modesto, Calif., was to talk on "Growth Regulating Substances, Including Defoliants."

The Soil Improvement Committee was to be in charge of the early afternoon session with a talk on the National Safety Program following. Taking part in the first session were George Harrison, director, U. S. Cotton Experiment Station, Shafter, Calif.; Dr. W. E. Martin, Calif. Agricultural Extension Service; Dr. J. Fielding Reed, American Potash Institute, Dr. Oscar Loren, Calif. Agricultural Experiment Station; Dr. Leonard Wohletz, U. S. D. A. Soil Conservation Service; and Dr. H. D. Chapman, acting director, Citrus Experiment Station, Riverside, Calif. H. R. Krueger, director of Technical Service, Phillips Chemical Co., Bartlesville, Okla., was to report on the recent industry-wide meeting of the Fertilizer Safety sub-section in Chicago.

The annual banquet was scheduled for Friday night, with the awarding of various prizes. Dancing was to follow the banquet.

Saturday's program was devoted to a tour of Fresno State College Agricultural Farm and was to include the witnessing of machine harvesting of a large cotton field. Golf and bowling for the men and a putting contest for the ladies was to be included on Saturday's program.

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St. Regis Starts Plant

Construction of an addition to its multiwall bag plant at Pensacola, Florida, has been announced by St. Regis Paper Co. The expansion of the present bag plant comprises a two-story addition 360 feet by 144 feet and a one-story office section addition, 36 feet by 360 feet, to house bag division services. The new capacity is expected to be available for production late in 1952.

The company also reports good progress in its construction of a new bag plant at Tacoma, Washington, which will replace the leased bag plant which the company is presently operating at Seattle. Occupying 81,600 square feet of floor space, the new bag plant at Tacoma is being built as an addition to the company's kraft paper mill there and when completed will provide the company with a completely integrated operation at that center. The new plant at Tacoma is expected to be in operation early next year.

•

Lime Use Up in U. S.

A slight increase in consumption of liming materials during 1950 has been announced by the National Lime Association, in a joint report with the Agricultural Limestone Institute. According to the survey, the overall 1950 figures reflect an increase of about .9% over 1949 in both total tonnage of liming materials and calcium oxide equivalent. The east-central section was the area of greatest increase, although both the northeast and southern section were up considerably. However, these gains were somewhat offset by decreases in other sections of the country.

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Delaney Hearings Convene on Coast

CONGRESSMAN James J. Delaney, chairman of the Select Committee to investigate the use of chemicals in food products, has announced that the committee would hold field hearings in the fruit-growing districts of Washington State and the produce areas of California.

Mr. Delaney said the field hearings had been decided upon in response to numerous requests from the West Coast. Fruit producers and processors, entomologists, pharmacologists, and other scientists will appear before the committee and give their views on the use of chemicals in cultivating and processing feed. The committee also plans to inspect orchards, farms and canneries for first-hand knowledge of the problems of produce gathering, processing and marketing.

In view of the fact that the House of Representatives, on October 15, 1951, authorized an investigation of the effect of the use of synthetics in the production of cosmetics, Mr. Delaney stated that witnesses qualified to furnish the committee with pertinent data on the production of cosmetics would also be called upon to testify.

The Committee's schedule, showing the date of hearings, the location of the hearing room, and the local headquarters of the committee is as follows:

Spokane, Washington, Tuesday, November 13; 10 a.m., in U. S. District Court room, Post Office Building. Headquarters for Committee: Davenport Hotel, November 12-14.

Seattle Wash., Saturday, Nov. 17; 10 a.m. in Customs Court room 117, Federal Office Building. Headquarters for Committee: Olympic Hotel, November 16-18.

San Francisco, Calif., Tuesday & Wednesday, Nov. 20 and 21; 10 a.m., in room 39, Federal Building, Fulton & Leavenworth Streets. Headquarters for Committee in San Francisco: St. Francis Hotel, November 19-21.

Los Angeles, Friday & Saturday, Nov. 23 & 24; 10 a.m. in room 229, U. S. Post Office and Court House Building. Headquarters for the Committee in Los Angeles: Biltmore Hotel, November 22-27.

Mr. Delaney stated that all local inquiries regarding names of witnesses and other information should be directed to the headquarters of the Committee in the various cities, rather than to the hearing room itself.

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Big Co-op Plant for Kan.

Consumer Cooperative Association is planning to build a $16 million nitrogen fertilizer plant at Lawrence, Kansas, to serve the needs of midwestern farmers. The new plant will be situated on a 320-acre tract, and will employ a permanent staff of about 150 persons when completed.

Extensive surveys were made of the area before the group made its decision to build. According to the Association, the following findings and conclusions were reached:

1. Total fertilizer consumption in the midwest has increased 935 per cent over the 1930-35 average.
2. Nitrogen consumption increased 822 per cent between 1944 and 1949.
3. Demand for nitrogen will be 260,000 tons annually by 1960, whereas 1950 consumption was only 57,000 tons.
4. One year's output of the proposed C. C. A. plant could at present prices, add $75,000,000 to the value of a single year's corn crop in the midwest.
5. A co-op owned nitrogen plant can be of vital importance in helping Midwest farmers keep abreast of production goals, and free from possible monopolistic control of a commodity essential to efficient farming.

N. E. Weed Conference Officials Meet

Officers and committee members of the Northeastern Weed Control Conference met in New York recently to make plans for the group's annual meeting scheduled for January 2-4 at the New Yorker Hotel, New York.

Front row: (L to R) W. H. Lachman, chairman, Coordinating Committee, University of Massachusetts, Amherst; C. E. Minarik, NEWCC vice-president, Camp Detrick, Frederick, Md.; Dr. S. M. Raleigh, NEWCC president, Pennsylvania State College, State College, Pa.; and W. C. Jacob, NEWCC secretary-treasurer, Long Island Vegetable Research Farm, Riverhead, L. I.

Back row: (L to R): H. J. Carew, chairman of the Public Relations Committee, Cornell University, Ithaca, N. Y.; Walter Baran, chairman of Local Arrangements Committee, Dow Chemical Co., New York; C. E. Phillips, chairman of Program Committee, University of Delaware, Newark, Del.; and R. M. McLaughlin, State Health Dept., White Plains, N. Y. Absent when the photo was taken was R. H. Beatty, chairman of the Publications Committee, American Chemical Paint Co., Ambler, Pa.

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Pletcher to Penick Post

Harold E. Pletcher has been appointed assistant production manager of S. B. Penick & Company, New York, according to an announcement by Albert D. Penick, executive vice-president.

HAROLD E. PLETCHER

After attending Manchester College where he obtained his B. S. degree, Mr. Pletcher was graduated from Syracuse University in 1933, with an M. S. degree in chemistry. Prior to his present appointment with Penick he was serving as production manager of the Ansco Division of General Aniline & Film Corp. and also directed the activities of its industrial and chemical engineering department.

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Typo Error Noted

In the September, 1951 "Listening Post" column by Dr. Paul R. Miller, reference is made to a product by Shell Chemical Corp., containing technical chlorobromopropene. Through an error, the product was called "CHP-55". It should have been designated as "Shell CBP-55."

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CSC Appoints DeFarkas

T. P. DeFarkas has been appointed general manager of the Export Division of Commercial Solvents Corporation, the company has announced. Mr. DeFarkas was formerly manager of direct sales of the Overseas Division of E. R. Squibb & Sons.

William D. Ticknor, Jr., who has been in CSC's Export Division since 1946, has been designated assistant general manager. The division plans to expand the export sales of the company's pharmaceuticals, agricultural feed supplements, insecticides, and industrial chemicals.

•

Columbia-Southern Appts.

Several further appointments in the Columbia-Southern Chemical Corporation sales organization have been announced by W. I. Galliher, vice-president in charge of sales. C. F. Bingham, formerly manager of Pigment Sales, has been named assistant director of sales. J. F. Dockum, formerly Philadelphia, Pa., district sales manager, also has been appointed assistant director of sales.

Both Mr. Bingham and Mr. Dockum will be located at the Corporation's headquarters in Pittsburgh. P. A. Fodor formerly of the market research and development department, here, will succeed Mr. Dockum as Philadelphia district sales manager. R. M. Simpson will become acting manager of Pigment Sales.

E. M. Rollins was named district sales manager at Dallas, Texas, with sales supervision of the Houston, Texas and New Orleans, La., branch sales offices.

Moving from the corporation's Barberton, Ohio, plant Technical Service Department to the Market Research and Development Department at Pittsburgh will be C. J. Stroemple.

•

Pitt Describes Products

Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., has compiled a summary of the principal products of five of its divisions in a new booklet entitled, "Pittsburgh Chemicals."

The 12-page letter size bulletin lists important uses and applications of the products and, whenever possible, their specifications. There are sections devoted to the company's Coal Chemicals, Plasticizer, Activated Carbons, Protective Coatings and Agricultural Chemicals divisions. Copies may be obtained by writing to the Pittsburgh Coke & Chemical Co., Grant Building, Pittsburgh 19, Pa.

duPont Advances Two

Clark W. Davis has been made general manager of the Grasselli Chemicals Department of E. I. duPont de Nemours & Co., Wilmington, Del., the company has announced. Mr. Davis succeeds Emmet C. Thompson who held the post from 1942 until his recent retirement. The Grasselli Department produces insecticides, fungicides and weed killers for agriculture.

CLARK W. DAVIS

Mr. Davis will be succeeded by Walter H. Salzenberg as assistant general manager of the Grasselli Department. Mr. Salzenberg, 43, first joined duPont in 1929 upon graduation from Lehigh U. with a degree in chemical engineering.

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IMC Buys Hoover & Mason

The board of directors of International Minerals & Chemical Coproration has authorized a contract with shareholders of Hoover and Mason Phosphate Company providing for the acquisition by IMC of Hoover and Mason's outstanding capital stock, according to a statement by Louis Ware, IMC president at the recent annual stockholders meeting.

The acquisition will be made through an exchange of International's common shares for those of Hoover and Mason Phosphate Company. IMC will acquire between $750,000 and $800,000 in cash or current assets and about 2500 acres of phosphate mining property, principally in the Rutherford Creek area in Maury County, Tennessee.

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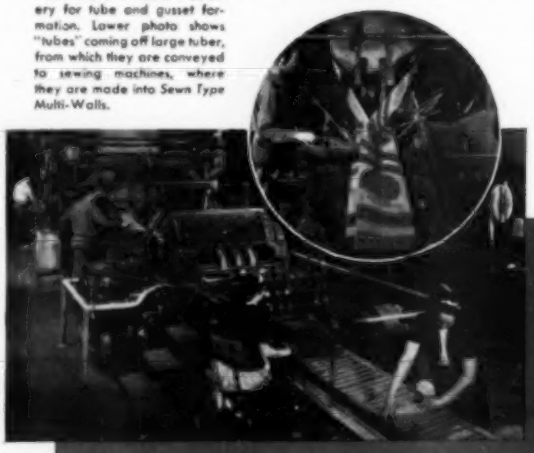
Insert shows intricate machinery for tube and gusset formation. Lower photo shows "tubes" coming off large tuber, from which they are conveyed to sewing machines, where they are made into Sewn Type Multi-Walls.



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IMC Re-elects Officers

All officers of International Minerals & Chemical Corporation were re-elected at the October 26th meeting of the board of directors in Chicago.

Officers are Louis Ware, president; James P. Margeson, Jr., executive vice-president; Robert P. Resch, vice-president and treasurer, Financial Division; Franklin Farley, vice-president, Phosphate Division; Maurice H. Lockwood, vice-president, Plant Food Division; A. Norman Into, vice-president, Potash Division; J. R. T. Bishop, vice-president, Amino Products Division; Dr. Paul D. V. Manning, vice-president, Research Division; Edward D. McDougal, Jr., general counsel and secretary; Edward Tubbs, comptroller; and Thomas M. Ware, chief engineer.

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To Double BHC Capacity

Stauffer Chemical Company has announced the beginning of construction for facilities at Henderson, Nevada, to double its capacity for the manufacture of "high gamma" benzene hexachloride. Equipment was ordered some time ago and the facilities will be completed shortly after the first of the year, the company states.

The process, designed by the Stauffer Research and Development Department, incorporates refinements based on over three years experience producing BHC. The new method gives a product said to have a much less objectionable odor.

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Ups Granulation Output

Following extensive experience with granulated mixed fertilizer produced by a new process in its Columbus, Ohio, and Perry, Iowa, plants, Davison Chemical Corp. is converting its other mixed fertilizer plants to the product as rapidly as possible, it has been announced by W. N. Watmough, Jr., vice-president in charge of the firm's fertilizer division.

The company's fertilizer plant at Curtis Bay (Baltimore) is expected to be 100% converted by the end of 1951 it was stated. Conversion is complete now at the Perry plant and the Columbus plant, presently 60 to 70% converted, will be operating entirely on granulated some time next year. At Nashville the rate of conversion will depend on the availability of construction and equipment materials, Mr. Watmough said.

Medical Ass'n Reports on BHC Hazards

CLINICAL reports of human poisonings from technical benzene hexachloride or lindane have been comparatively infrequent in the United States. Exposure to dusts of the technical mixture in field application and bagging operations has caused irritation of the upper respiratory tract, eyes, and skin; but these reactions were of minor consequence and required medical assistance in only a few instances. Similar reactions to powdered forms of the individual alpha, delta, and beta isomers have been experienced by workers engaged in their manufacture and formulation. Unusual symptoms in two workers engaged in preparing batches of gamma benzene hexachloride for field tests have also been reported. It was suggested that these symptoms might have been attributable to absorption of the compound through the skin.

Moderate and severe reactions in three field workers applying technical benzene hexachloride in a petroleum-solvent base by means of a thermal aerosol generator have also been observed. During the period of application, the wind fluctuated both in direction and intensity, enveloping the workers for varying periods of time. One worker is stated to have received a maximum exposure of approximately 20 minutes duration. Several hours later he became ill, turned pale, and experienced chills and fever. During the night he had severe headaches and perspired profusely. A lack of normal equilibrium and depth perception was also noted. The patient recovered in approximately ten days with no apparent after-effects. The other two workers received less severe exposures. Although their symptoms were similar to those of the first worker, they were less intense and of shorter duration. Severe headaches, aching bones and joints, high temperature (104 F.), chills, cold sweats, dizziness, and slight loss of equilibrium were experienced. Recovery occurred in 24 to 36 hours, respectively. Illness in all cases was attributed to the inhalation of excessive amounts of the insecticidal smoke, although certain of the symptoms reported are not commonly associated with this type of poisoning.

An attempted suicide involving the ingestion of approximately 30 gm. of a 50% wettable powder of benzene hexachloride whose content of the gamma isomer was about 15% has been reported to the Committee. The onset and train of symptoms were stated to be similar to those observed in experimental animals.

Two suspected, but unconfirmed, fatalities of BHC spray products have been brought to the attention of the Committee. In both instances, the insecticide was considered to have played a secondary, though contributory, role in the cause of death. A third case, involving the convulsive death of a child living a few yards away from an insecticide mixing plant, was reported in the medical literature. Subsequent investigation failed to disclose anything which would support the statement that benzene hexachloride was implicated.

In Argentina, occupational dermatitis in workmen exposed to benzene hexacloride is claimed to have reached as high as 25%. This alarming incidence of reaction was soon decreased when prophylactic measures and proper hygiene were introduced. The authors presented 39 cases of dermatitis in persons engaged in grinding and mixing activities, chemical manipulations, and other manufacturing procedures. In

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Industry Patents

2,554,756. RODENTICIDE COMPOSITION. Patent issued May 29, 1951 to Franklin D. Smith, St. Louis, Mo., assignor to the Monsanto Chemical Company, St. Louis, Mo. A rodenticide and insectivoricide composition comprising a processed food product and 0.5 to 20% of the hexa ester of tetrapolyphosphoric acid, the said ester residue being a radical containing from 1 to 4 carbon atoms selected from the group consisting of alkyl, alkenyl and cycloalkyl.

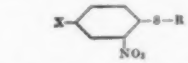
2,554,757. PYROPHOSPHATE ESTERS AS RODENTICIDES. Patent issued May 29, 1951 to Franklin D. Smith, Webster Groves, and John S. Harris, Richmond Heights, Mo. A rodenticide and insectivoricide composition comprising a processed solid food product as an edible carrier and as a toxic ingredient, 0.5 to 20% of a tetra ester of pyrophosphoric acid, the said ester residue being a radical containing from 1 to 4 carbon atoms selected from the group consisting of alkyl chloralkyl, alkenyl and cycloalkyl.

2,555,796. SOIL FUMIGANT COMPRISING FUMARIC DINITRILE. Patent issued June 5, 1951 to Robert L. Krouse, Avondale, Pa., assignor to E. I DuPont de Nemours & Company, Wilmington, Del. A method for fumigating and disinfecting soil which comprises applying to and mixing with the soil a composition containing fumaric dinitrile.

2,555,889. MANUFACTURE OF BENZENE HEXACHLORIDE. Patent issued June 5, 1951 to Alfred Jerome Kolka, Birmingham, and Harold David Orloff, Detroit, Mich., assignors to the Ethyl Corporation, New York, N. Y. In the process of manufacturing benzene hexachloride by the photochlorination of benzene, the improvement comprising conducting said photochlorination of benzene in admixture with an additive selected from the class consisting of sulfur, selenium, tellurium and chlorides thereof, the concentration of said additive being within the range of approximately .02 to 2.0 parts per 100 parts of benzene.

2,556,300. INSECTICIDAL COMPOSITION. Patent issued June 12, 1951 to Jere C. Showalter, Goose Creek, Texas, assignor to Standard Oil Development Company, a corporation of Delaware. An insecticidal composition of matter consisting of no more than 5% white petroleum oil, no more than 5% salt of a petroleum alkaline sulfonate and approximately equal amounts of para dichloro diphenyl trichloroethane and of a volatile aromatic solvent.

2,557,520. PESTICIDAL COMPOSITIONS AND PROCESS OF PRODUCING THEM. Patent issued June 19, 1951 to Davis A. Skinner, Compton, and Elvin L. Wampler, Anaheim, Calif., assignors to Union Oil Company of California, Los Angeles, Calif. A pest control composition essentially comprising an aqueous dispersion containing from about 0.1 to about 5 per cent by weight of an alkyl aryl sulfide having the general formula:



wherein R represents an alkyl group and X represents a substituent selected from the class consisting of nitro and halogen groups, and from about 0.001 to about 0.5 per cent of a dispersing agent.

2,557,618. BRUSH AND SHRUB KILLER. Patent issued June 19 1951 to Emerson B. Stoll, Sebree, Ky., assignor by mesne assignments to Stull's Chemicals Inc., a corporation of Texas. A brush and shrub killer consisting of a chlorinated phenoxyacetic acid herbicide in a non-phytotoxic horticultural base oil having a boiling range of 500-636° F. and an unsulfonated residue of 94 per cent by volume.

Trade Mark Applications

THIODOW, in large bold face capitals, for fungicides. Filed August 5, 1950 by the Dow Chemical Co., Midland, Michigan. Claims use since March 27, 1950.

FERVITE, in capital and lower case old style letters in the center of a design consisting of a landscape below the word and the actual word superimposed over a cloud above the landscape and both word and landscape surrounded by a circular design made up of what appears to be bound oats, for fertilizers, particularly chemical mixtures including nitrogen, phosphorous and potassium. Filed March 31, by the Snyder Chemical Company, Inc., Topeka, Kans. Claims use since May 7, 148.

RL, in hand script capitals in white and surrounded by a red circular background and this is surrounded by two larger black concentric circles, which are covered at the bottom by a mountain, for fertilizer. Filed July 20, 1950 by Red Lane Calcareous Sinter Co., Inc., Thermopolis, Wyo., and Billings Montana. Claims use since Apr. 15, 1950.

INLAND, in capital letters, for animal and chemical fertilizers. Filed August 4, 1950 by Inland Fertilizer Co., Los Angeles, Calif. Claims use since March 1, 1948.

NIAGROL, in capital and lower case outline letters, for parasiticides. Filed May 19, 1949 by Food Machinery and Chemical Corporation, San Jose, Calif. Claims use since May 19, 1936.

SULFASAN, in capital letters, for herbicides, insecticides and fungicides. Filed September 19, 1949 by Monsanto Chemical Company, St. Louis, Mo. Claims use since February 11, 1949.

USS, in hand-lettered boldface capitals, the middle letter S being the first and last letters, for fertilizers. Filed November 23, 1949 by the United States Steel Corporation, New York. Claims use since January, 1939.

COLLOIDAL SOFT PHOSPHATE, FOR HUMANITY'S SAKE, the words colloidal soft phosphate in white on a black oval which is cut in two by a square in white with black capital letters which read for Humanity's sake, the word humanity's in larger letters than the other two words, for fertilizers. Filed June 21, 1950 by Will J. Hoover, doing business as the Hoover Soil Service, Gilman, Ill. Claims use since May 2, 1950.

KILANE, in capital hand letters, for insecticides. Filed August 21, 1950 by Chandler R. Parsons, doing business as The Parsons Chemical Works, Grand Ledge, Michigan, Claims use since January 2, 1939.

FERRO, in capital stencil lettters for fungicides and inorganic cobalt compounds. Filed September 29, 1949 by the Ferro Enamel Corporation, Cleveland, Ohio. Claims use since April 1, 1946.

ENTOSAN, in block capital letters, for insecticidal liquid for use as spray. Filed March 9, 1950 by McLaughlin Gormley King, Minneapolis, Minn. Claims use since August 26, 1949.

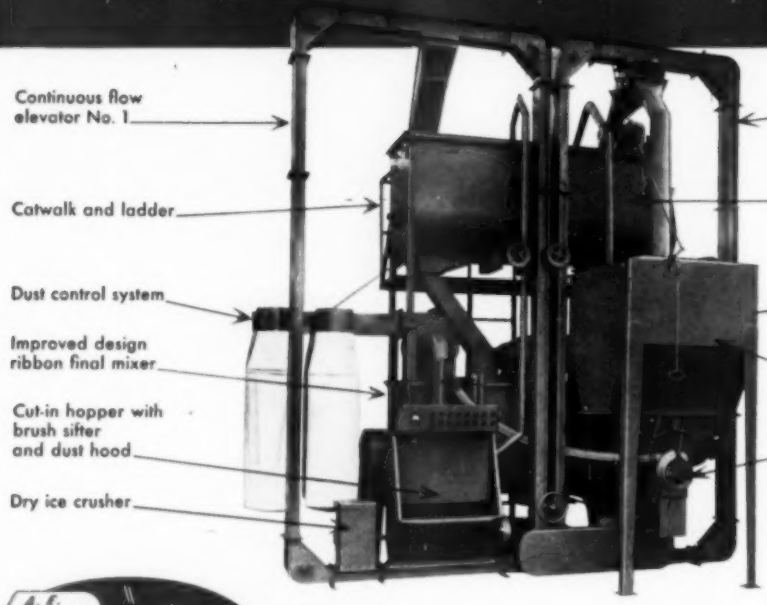
FLY-F_Z, in block capital letters, for insecticides. Filed September 20, 1950 by Davis Manufacturing Company, Knoxville, Tenn. Claims use since May 1, 1950.

1038, in bold face block numbers, for insecticides and parasiticides. Filed October 31, 1950 by California Spray-Chemical Corporation, Wilmington, Del., and Richmond, Calif. Claims use since August 30, 1948.

SOCCI, in elongated block capitals, for fungicidal material. Filed October 31, 1949 by Scientific Oil Compounding Company, Chicago, Ill. Claims use since January 3, 1949.

ARAMITE, in hand lettered capitals, for agricultural chemicals for applying to growing trees, shrubs and plant life to control or destroy mites. Filed November 10, 1949 by United States Rubber Company, New York, N. Y. Claims use since October 20, 1949.

FOR FORMULATING CONCENTRATES . . . and
Processing and Packaging Field Strength Insecticides


Continuous flow elevator No. 1
Catwalk and ladder
Dust control system
Improved design ribbon final mixer
Cut-in hopper with brush sifter and dust hood
Dry ice crusher
Continuous flow elevator No. 2
Improved design ribbon pre-mixer
Fine grinding pulverizer (not visible in picture)
Holding bin
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UNI-BLENDOR
Dual Type
COMPLETE in one compact unit
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PATENT APPLIED FOR

The R. T. R. UNI-BLENDOR—*Dual type*— performs a dual function:

1. ***Formulates concentrates from technical grade toxicants***
2. ***Processes concentrates to produce field strength insecticides***

Handling 40 cu. ft. batches, the equipment requires only 11′ x 11′ of floor space and 16′ of head room. Each unit is plant tested to insure maximum efficiency and is shipped in sections which any mechanic can readily assemble.

* * * * * * *

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* **Ready to Run . . . *and ready to earn***

R. T. R. (*Ready to Run*) Uni-Blendor equipment is designed by engineers who are recognized specialists upon insecticide processing. The units, which incorporate all of the advantages of individually designed plants, require less capital investment in equipment, eliminate the expense of remodeling buildings, avoid delays in installation, disappointments in operation and production—all of which frequently are involved in individually designed equipment.

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☐ Dual Type ☐ Standard Type

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Firm Name_____
Street Address_____
City_____ Zone____ State_____

all cases except one, the workers were in intimate contact with benzene hexachloride. Reaction rates varied from single contacts to those involving several months exposure. The disorders, in most instances, were of short duration and disappeared without sequels.

A fatal case of poisoning caused by the accidental ingestion of a benzene hexachloride solution was reported in Germany. Fifteen cubic centimeters of a 30% solution of benzene hexachloride in an unspecified organic solvent was ingested by a five-year-old girl weighing approximately 50 pounds (25 kg.). Shortly after, difficult breathing, cyanosis and clonic-tonic convulsions set in, and some of the solution was vomited. Three hours later, the child was hospitalized, her stomach was pumped and therapy to restore a failing circulation was vainly instituted.

—Report of Committee on Pesticides, American Medical Association, in *AMA Journal*, October 6, 1951.

CONTROL OFFICIALS

(*Continued from page 43*)

very complete protection to the public health against any possible danger arising from the residue of either new or old pesticides. It would effectively preclude the use of any pesticide for which no tolerance is established."

Mr. Conner stated further, that the protection would be "equally complete" from a procedural standpoint, also. "The tolerances can be enforced not only by seizure actions or criminal prosecution under the Federal Food, Drug and Cosmetic Act, but . . . they could also be implemented and enforced by the registration provisions of the Federal Insecticide, Fungicide and Rodenticide Act."

The Washington attorney declared that many of those who have expressed doubt that present authority exists to protect the public against injury from pesticidal residues, must base such a premise on either a lack of understanding of this "reservoir of authority in the Federal Food Drug and Cosmetic Act . . . or by a willful disregard of the plain extent of this authority." He continued by saying that if the tolerance-setting authority had been exercised during the past 13 years, together with tolerances which would have been put into effect as a result of this activity, the "specter of inadequate control" would have been precluded.

Rodney C. Berry, Richmond, Va., reminded the fertilizer officials that new chemical compounds placed on the market bring new problems to the control officials, and that suggestions for laws to cover new conditions should be suggested by the control officials themselves, who are on the job and know well what is needed.

Mr. Berry deplored the fact that in some areas, fertilizer tax monies are diverted into general funds, with only a portion of the tax going back into the control work for which it was intended. "Too many dollars are going into unrelated work," Mr. Berry declared.

Problems connected with mixtures of fertilizers and pesticides were also touched on by the A.A.F.C.O. president who said that such products can hardly avoid causing confusion, particularly where more than one control official is handling the work.

Paul T. Truitt, president, American Plant Food Council, Washington, pointed out the increasing use of fertilizer materials, predicting that the 1950-60 decade will see the use of fertilizer double over the previous ten year period. Should this come about, new and heavier responsibilities will be thrust on both the industry and the control officials. Greatly increased use will mean much additional work for control laboratories and will make necessary more trained personnel. The fertilizer industry has no objection to a rigid regulatory and control program, but on the contrary, is "interested in encouraging and supporting . . . state organizations which function to protect the fertilizer industry and the farmer alike against any who . . . practice unfair dealing." You will render the farmers of your state and the fertilizer industry as well a valuable service by charting your course in the direction of expanded inspection and control programs," he continued.

Mr. Truitt expressed doubt that the Federal Government could do a better job of inspecting fertilizers, than is being done by state agencies. He told the state control officials that "Our confidence in your ability and appreciation for the service you render does not set aside the hard fact that bills are pending in the Congress to provide for Federal inspection of fertilizers."

Following Mr. Truitt on the program was Dr. Russell Coleman, president of the National Fertilizer Association, Washington, D. C., who looked ahead to the supply situation for the coming year. Reminding that the basic need for the industry is now and will continue to be for some time, a lack of sulfur, he declared that in view of the shortage of the element in the U. S., it seems that our exporting 25% of our total output is out of line. Superphosphate will be short next year, and spot shortages of potash may be expected in 1952, although the overall picture is good with an increase of perhaps 13% expected. Solid nitrogen products present one of the critical shortages, he said. The demand for nitrogen is increasing, and may be from 15 to 20 percent greater next year, whereas the increase in nitrogen supply will be only from 5 to 8%.

Dr. H. B. Siems, Swift & Co., Chicago, told the group of various research projects under way in the fertilizer industry. He said that such activities have been in cooperation with the National Joint Committee on Fertilizer Application; the Plant Food Research Committee of the National Fertilizer Association; Educational and Service organizations; and the Committee on Tagged Element Research. This research work is financed by a number of companies in the industry, he said, and

"I get better results from top dressing with U·S·S Ammonium Sulphate than any other nitrogen material"

-says Basco Coggins
Reidville, S. C.

● With the help of U·S·S Ammonium Sulphate, this wheat field produced a yield of 42⅝ bushels per acre for Basco Coggins, Reidville, S. C. The yield was more than three times his state's 10-year average of 13.8 bushels per acre.

"I find," says Mr. Coggins, "that I get better results from using Ammonium Sulphate as top-dressing on my corn, small grain and pasture grass than any other nitrogen material. Its long-lasting qualities give me bigger yields and keeps my crops and pasture grass greener, longer."

Mr. Coggins plowed under 3000 pounds of limestone and 300 pounds of complete fertilizer per acre. Then he top-dressed 100 pounds of U·S·S Ammonium Sulphate in February and followed with another 100 pounds in March.

Bigger yields for farmers ... better business for you

● All over the United States, experiences like this are convincing farmers there's no substitute for adequate nitrogen supplied by U·S·S Ammonium Sulphate.

And wide-awake fertilizer dealers and manufacturers are capitalizing on the growing demand for adequate nitrogen by offering U·S·S Ammonium Sulphate, both in bags for direct application and as the major nitrogen source in their high-analysis mixed fertilizers.

U·S·S Ammonium Sulphate furnishes crops with nitrogen when they need it most. It won't leach out of soils during spring rains, yet converts to available form during the warm, moist growing season. It stands up well in storage, handles well in distributing equipment.

Be ready for your share of this business by including U·S·S Ammonium Sulphate in your mixed fertilizers and offering it bagged for direct application. Supplies are somewhat short today, so anticipate your needs in advance. United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

USS

U·S·S AMMONIUM SULPHATE

UNITED STATES STEEL

the project covers fundamental as well as applied research. Work is also being done on research in the equipment field, which will mean better application methods to benefit both the manufacturers of fertilizers and agriculture in general.

Speaking on minor element deficiencies in New Jersey soils, Dr. Firman E. Bear, Rutgers University, presented many case histories where crop yields had been increased significantly by the addition of minute amounts of "minor" elements such as cobalt, molybdenum, zinc, manganese, etc. One test increased the yield of alfalfa by 13% by the addition of only one pound of sodium molybdate per acre. He listed the 20 types of soil found in New Jersey and discussed the amounts of minor elements in each. He also pointed out the difficulties involved in handling and applying such minute quantities of materials, and the injury to crops occurring when an over-supply of these elements is present in the soil.

A paper, "Acid Insoluble Ash and Carbamates in Mixed Fertilizers" was presented at the afternoon session. Authors of the paper, all connected with the U.S.D.A. Plant Industry Station, Beltsville, Md., were K. G. Clark, V. L. Gaddy, A. E. Blair and F. D. Lundstrom. Reports of investigators from various states rounded out the program of Friday afternoon.

A.E.P.C.O. Meets

IN his address before the Economic Poisons Control Officials in their annual meeting on October 6, Allen B. Lemmon, Sacramento, Calif., president of the group, named some of the problems facing the officials. These include the registration and labeling of economic poisons; the application of pesticides, and residues. He urged the officials to cooperate with each other in keeping fellow enforcement men informed of work being done, thus adding to the total knowledge.

That defoliants are becoming more and more important was pointed out by the president, who added that the volume of herbicides is also increasing year after year.

are your insecticides

BLENDED

or just mixed?

The Spatula Test will tell

Conventional mixing seldom produces fine powder blends of high uniformity. Telltale lumps, nodules, and streaks under the spatula test betray inadequately mixed formulas. Imperfectly blended agricultural dusts mean incomplete coverage, low field efficiency, complaints and lost business.

Sprout-Waldron's *Intimate Blending Systems* are replacing old-fashioned mixers in insecticide plants all over the country. Engineered to individual needs, they have an unrivaled record of efficiency and safety in a great variety of installations. Low-cost, dust-free operation—producing formulas of the highest uniformity have made Sprout-Waldron's *Intimate Blending Systems* a byword wherever insecticide and fungicide dust blends are made and used.

Use the advice of Sprout-Waldron specialists to improve your product, safeguard your personnel, step up production, and increase your profits. Write for Bulletin I-846 today!

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by Stanley F. Bailey and *Leslie M. Smith*

Professor of Entomology, U. of California — Associate Professor of Entomology, U. of California

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A PRACTICAL handbook of agricultural pest control, designed for use by the custom sprayer, the pest control operator, farm advisor, agricultural chemical salesman and field worker is now ready. This handbook covers the agricultural chemicals (insecticides, fungicides, herbicides, plant hormones, nutrient sprays, defoliants, etc), their rates of application, useful formulas, as well as chapters on fumigation, spray machines, toxicology, dusts and dusting, aircraft, and mosquito control. Use the coupon below for your copy now!

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These, as well as the introduction of other chemical compounds, all add to the mounting problems of the control official. Many of these materials are toxic in one way or another and can create hazards such as the unintentional damaging of neighboring crops through drift of herbicides.

Uniform standards are needed in labeling requirements, he declared, pointing out the need for some kind of handbook to aid in this connection. Airplane application is a factor which the control official must consider, and many states have laws in effect to cover the use of aircraft in the application of various pesticides.

C. O. Persing, Stauffer Chemical Co., permitted the group a look into the cost of producing a given pesticidal product. Beginning with the costs involved in patent and attorney fees, three years of field studies, including salaries, expenses, grants, etc., he said the cost would come to around $50,000. Then toxicological studies must be made for a couple years to cover both the chronic oral and acute tests, and this portion of the operation will cost around $20,000 to $30,000.

The development of analytical procedure to determine residues, etc., amounts to about $10,000, plus studies on the effect of the material on foods, seeds, leaves, and tests on fruits and vegetables, $2,500.

These, said Dr. Persing, are only preliminary expenses. The heavy costs begin with pilot plant production and production research. This operation ranges between $100,000 and $250,000, plus administrative costs of some $10,000. He called attention to one product which cost $1,350,000 to perfect and place on the market, another costing $400,000 and a third, relatively inexpensive, which totaled $150,000.

The risks involved in getting such products on the market are many, he said, particularly from the possibility of some other new product's appearing at the same time or subsequently.

A report on warfarin and its control of destructive rodents was made by Dr. W. W. Dykstra, Assistant Chief, Predator and Rodent control, U. S. Dept. of Agriculture, Washington, D. C. He described some of the methods of baiting for effective control of agricultural rats, and told of success achieved through use of warfarin in different parts of the country.

V. A. Tiedjens, director of the Virginia Truck Experiment Station, Blacksburg, Va., presented a paper, "Soil Use of New Insecticides," prepared by himself and D. E. Greenwood, also of the Virginia Station.

The paper covered the toxicity of soil insecticides to plants, the residual, or long-range effects of such materials; possible off-flavor on plants; translocation and residues. (Complete text of Dr. Tiedjens' paper is scheduled for publication in Agricultural Chemicals in an early issue.)

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TRIANGLE BRAND
BASIC COPPER SULPHATE
For BETTER and SAFE Control of
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Triangle Brand Copper Sulphate is dependable . . . safe and costs less. Yet, by actual field test, it gives greater yields! That's why growers actually use more Triangle Brand Copper products on their crops than any similar plant protection material. Don't be satisfied with "substitutes." Get the best—always demand Triangle Brand.
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SO MANY INSECTS

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AS IT IS TODAY WITH

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Write for a Grower's Handbook describing the many uses for parathion insecticide formulations.

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Manufacturer of Parathion Technical

Agricultural Chemicals Division

30 Rockefeller Plaza, New York 20, N. Y.

Lion Oil Ups Kelly

Douglas Kelly, Jr., has been named manager of chemical sales in the western division of Lion Oil Company, effective October 1, 1951, according to Leroy Donald, Lion's Chemical Division sales manager. Mr. Kelly was formerly assistant sales manager of Lion's western division.

AAEE-APS MEET

(Continued from page 45)

Value of Economic Insect Surveys to our National Agriculture," George C. Decker, entomologist, Illinois State Natural History Survey; "Importance to Industry of Economic Insect Surveys," Lea S. Hitchner, National Agricultural Chemicals Association; "Economic Insect Surveys in Relation to Biological Warfare Defense," M. R. Clarkson, special assistant to the administrator of the Agricultural Research Administration in Charge of Defense Efforts; "State Surveys in Relation to National Insect Problems," H. M. Armitage, California State Department of Agriculture; "The Use of Survey Information in Effectuating Insect Control," W. C. Nettles, Clemson Agricultural College, Clemson, South Carolina; and "A Program for Federal-State Cooperative Economic Insect Surveys," Kelvin Dorward, Bureau of Entomology and Plant Quarantine, U.S.D.A.

A section of medical entomology is scheduled for both Tuesday and Wednesday mornings, and a joint meeting with the ESA is scheduled for Wednesday morning, when motion pictures on entomological subjects will be shown. A joint meeting with the Potato Association of America is scheduled for Thursday afternoon.

The annual banquet will be held Tuesday evening, and a program of entertainment will follow, according to the program.★★

FERTILIZER SAFETY

(Continued from page 40)

Ingersoll, Ontario, Canada, told about their successful safety program, pointing out that their reports to management covered the dollars-and-cents savings brought about through the safety program as well as the high cost of accidents. This type of presentation, he declared, is more convincing to management than statistics regarding accident severity, etc.

A luncheon for members of the Fertilizer Safety Advisory Committee was given by the American Plant Food Council at the Blackstone Hotel, Chicago, on the day of the meeting. APFC president, Paul T. Truitt acted as host at this gathering which heard preliminary discussions on fertilizer safety.

FUNGICIDES

(Continued from page 67)

State plant disease specialists to preclude any unnecessary work load

WETTABLE POWDER INSECTICIDE SUSPENSIONS

UNIFORMLY—
ECONOMICALLY STABILIZED
WITH

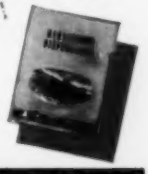
MARASPERSE

THE MORE EFFECTIVE
low cost DISPERSANT

Stable dispersions of DDT, BHC, Sulfur . . . in fact any insecticide formulated as a wettable powder . . . are easily obtained by the addition of one to two percent Marasperse. With Marasperse added, spray tank contents are maintained at a uniform concentration. Insecticides are uniformly applied for maximum effectiveness throughout the spraying period.

Because it is a non-hygroscopic and free-flowing powder, Marasperse facilitates grinding and blending operations. It can be stored indefinitely without caking or deteriorating.

The powerful dispersing action of Marasperse is unaffected by the hardest waters. Marasperse enhances the action of wetting agents and permits the use of reduced amounts of these high cost components in formulations. A neutral compound, Marasperse will not affect toxicity of the insecticide.



Write for samples and additional information on Marasperse. Our technical staff will welcome the opportunity to cooperate with you.

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If there is any bag that positively won't permit dry particles to sift, this is it! Betner's new method of construction combines special liners with folding, glueing and heat-sealing in such a way that there is virtually "No-Sift" for contents. This new Betner bag is perfect for insecticides, fertilizers and other chemicals that must be packaged in sift proof containers. It is also ideally suited for packaging foods. Available in sizes holding from 1 to 25 lbs. of bulk powdered material; can be pre-printed up to four colors; and can be made in several combinations of materials.

and...

Betner can supply the special machinery for closing the "Duo-Tite" bag . . . it heat-seals, double folds and pastes the tops in exactly the same manner as the bottom is constructed.

A complete bag service...

from idea to finished bag to machinery for closing bags and filling and closing liner bags for cartons. Your inquiries are welcome, and samples with full technical information will be supplied promptly.

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upon such individuals. This will, of course, require a careful checking and screening at local, county, and other State levels. Such utilization of State experts would greatly speed identification, by allowing the Bureau laboratory at Beltsville to devote maximum attention to specimens requiring extensive culturing and the use of herbarium and library facilities.

It is desirable that a plant pathologist be designated as leader within each State. Such a leader can review information, transmit disease specimens to the proper State or Federal pathologist for identification, spearhead any control program to be initiated, and in general direct the program in his State. Also, he could effectively distribute the warning letters and *The Plant Disease Courier* to persons in the State authorized to receive and utilize such information. This leader might be the pathologist now designated as the collaborator of The Plant Disease Survey or some other pathologist who might better be able to handle this responsibility of keeping in touch with the local, State and Federal cooperation personnel.

Control Procedures

DISCOVERY of any new plant disease, or a disease new to an area, should be promptly confirmed and steps taken immediately to initiate such control supervision, eradication, or regulatory measures as the situation may warrant. In case effort to eradicate the disease appears desirable, control agencies within the State or States concerned have the legal responsibility for initiating such action. The Federal agency authorized to cooperate in such control activities is the Bureau of Entomology and Plant Quarantine. The personnel of the Bureau of Plant Industry, Soils, and Agricultural Engineering would provide all possible technical assistance for the guidance of such a control program, but any eradicative procedures would be the primary responsibility of State control agencies and the Bureau of Entomology and Plant Quarantine.★★

FERTILIZER LAWS

(*Continued from page 32*)

25¢ per ton. The fee is based on semi-annual tonnage reports submitted on January 15 and July 15.

Labeling Requirements: In addition to a statement as to weight, brand, and maker, labels must show the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash.

In the case of bone, tankage and other organic phosphate materials on which the chemist makes no determination of available phosphoric acid, the total phosphoric acid must be guaranteed. However, unacidulated material, phosphatic materials, and basic slag must be guaranteed as to both total and available phosphoric acid.

The Commissioner of Agriculture may permit or require mixed fertilizers to be guaranteed with additional information if the foregoing does not adequately describe the fertility value of the product. He may also permit or require the potential basicity or acidity to be guaranteed.

Southern States

Alabama[15]

Scope: The law applies to commercial fertilizers, but does not define the term.

Registration Fees: A registration fee of $5.00 per brand is required. The fee is payable annually on September 30. There is also a $1.00 license fee for dealers.

Tonnage Reports and Fees: A stamp tax or fee of 30¢ per ton is also required. The fee is based on tax tags purchased or on monthly tonnage reports if an appropriate permit has been obtained to use the latter device. Tonnage reports and stamp taxes are due and payable on the twentieth day of each month.

It may be noted that a provision in the law which required shippers of fertilizers to notify the Commissioner of Agriculture and industries of certain shipments was repealed in 1951.

Labeling Requirements: In addition to statements as to weight, brand, and maker, labels must show the minimum percentages of nitrogen and its sources and within 10% of the amount of the source in the form of both organic and inorganic materials, available phosphoric acid and its sources and within 10% of the amount of each material from which the available phosphoric acid is obtained, potash and its sources and within 10% of the amount of each source. The percentages of nitrogen, available phosphoric acid and potash in complete fertilizers must be stated in even whole numbers. The sources and within 10% of the amount of filler and the total pounds of available plant food must also be shown.

In bone meal, tankage or other products where the phosphoric acid is not available to laboratory methods, but becomes available on the decomposition of the products of the soil, the phosphoric acid must be claimed as total phosphoric acid unless it is desired to claim available phosphoric acid also, in which case, the guarantee must take the form above set forth.

Arkansas[14]

Scope: The law applies to commercial fertilizers, but does not define the term.

Registration Fees: There is no requirement for registration fees, although all products must be registered.

Tonnage Reports and Fees: An inspection fee at the rate of 12½¢ per ton is the only fee required. The fee is based on monthly tonnage reports submitted before the tenth of each month.

Labeling Requirements: In addition to the usual statement as to weight, brand, and maker, labels must show the percentages of nitrogen, available phosphoric acid, potash soluble in distilled water, and such other information as the Plant Board may require in its regulations.

Florida[13]

Scope: The law applies to any material containing nitrogen, phosphoric acid, potash or any recognized plant food element or compound which is used primarily for its plant food content or, for compounding mixed fertilizer, except unmanipulated animal and vegetable manures.

Registration Fees: No registration fees are required, although all products must be registered.

Tonnage Reports and Fees: An inspection fee is imposed at the rate of 25¢ per ton. However, the fee is 10¢ per ton in the case of raw ground phosphate rock, soft phosphate, colloidal phosphate, phosphatic clays, and all other untreated phosphatic materials, peat or humus, and hydrated lime and limestone when sold or used for agricultural purposes.

The payment of the inspection fee must be shown on the tax tag bearing the chemical analysis noted below.

Labeling Requirements: Tags are required. The tags must state in addition to the statement as to weight, brand, and maker, the minimum percentages of total nitrogen, nitrate nitrogen, ammoniacal nitrogen, water soluble organic nitrogen, water insoluble nitrogen, available and insoluble phosphoric acid, water soluble potash, the total available primary plant food, and the maximum percentage of chlorine. The tags must also show all the materials from which these plant foods are derived.

If claims are made for any of the secondary plant foods, they must be guaranteed on the tag in percentages expressed as oxide, with the exception of sulphur which must be guaranteed as an element.

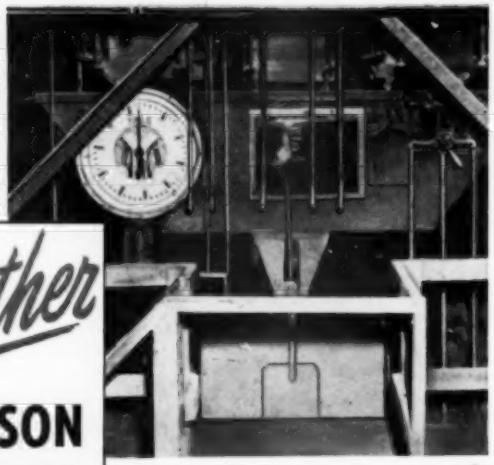
Where secondary plant foods are guaranteed in a mixture containing primary plant foods, the guarantee must be expressed as oxide only, except the element magnesium and sulphur. In this case, magnesium must be guaranteed as an oxide and the percentage guaranteed as to both total and water soluble; and sulphur must be guaranteed as an element.

Georgia[16]

Scope: The law applies to commercial fertilizers, but does not define the term.

Registration Fees: An annual registra-

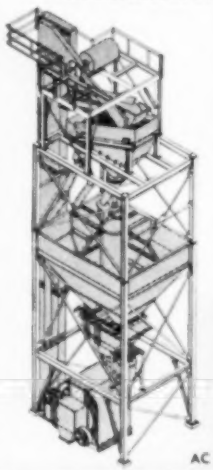
Johnson multiple material weigh-batcher, with 5,000-lb. dial head scale, accurately weighs up to 5 (or more) fine-grained materials. Top levers open fill valves from overhead 5 section bin. Lower lever discharges batch into the mixing unit.



Another

JOHNSON BLENDING PLANT

for midwestern fertilizer manufacturer

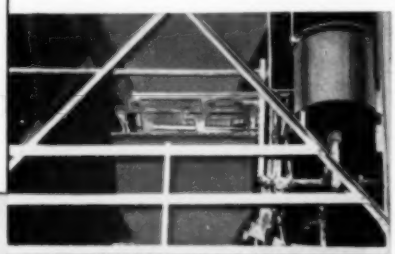


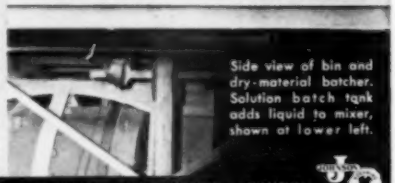
AC

TO modernize one of its plants, a leading midwestern fertilizer manufacturer installed Johnson elevator, bin and batching equipment . . . gained a 25% increase in production, and, at the same time, substantially reduced manpower requirements. As a result, the fertilizer firm has equipped another one of its manufacturing plants with Johnson blending equipment, shown here.

Here's how this mechanized handling eliminates slow, costly manual methods: In one continuous cycle of operation, material travels up bucket elevator to clod breaker . . . through separating screen into collecting hopper. From hopper, pulverized fertilizer passes through pivoted distributor into 5-section, 65 cu. yd. bin . . . then, to multiple-material weigh-batcher, and into mixing unit for final blending operation.

To check savings possible in your plants, call your Johnson distributor, or write us.





Side view of bin and dry-material batcher. Solution batch tank adds liquid to mixer, shown at lower left.

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tion fee of $5.00 per brand is required. The fee is payable on or before January 1. The law also imposes a license fee of $1.00 per brand for sellers of fertilizers who have not paid the registration fee.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 30¢ per ton. Formerly, this fee was paid through the device of tax tags. However, under a 1951 amendment, the Commissioner of Agriculture may relieve an applicant from the necessity of attaching fertilizer inspection tags and in lieu thereof require the inspection fee to be paid on the basis of tonnage reports.

Labeling Requirements: Tags are required. Tags must show in addition to a statement as to weight, brand, and maker, a guaranteed analysis giving the minimum percentages of total nitrogen in whole numbers and its sources and within 10% of the total amount of the sources in the form of organic and inorganic materials, available phosphoric acid and its sources and within 10% of the amount of each source, potash and its sources and within 10% of the amount of each source. The sources and pounds of filler and the total pounds of available plant food must also be stated. Wherever any fertilizer material is reduced from its original plant-food content, the amount of filler and the source used must be shown.

Louisiana[17]

Scope: The law applies to all materials sold for the purpose of promoting the growth of plants or exerting beneficial action on the soil. Materials specifically excluded are lime, limestone, marl, gypsum, sulphur, unground bones when mixed with other substances, and manure or excrement from any domestic animal provided it has not been dried or otherwise treated.

Registration Fees: Although registration is required, the law specifically provides that no charge shall be made for registration.

Tonnage Reports and Fees: An inspection fee is imposed at the rate of 25¢ per ton. The fee is based on quarterly tonnage reports submitted during December, March, June and September.

In addition, every person who has registered a fertilizer for sale in the state must mail to the Commissioner of Agriculture a statement or a copy of the invoice within three days of each sale, shipment or delivery, showing the official name of the fertilizer, the quantity and the name and address of the purchaser, and in the case of car lots, the initials and numbers of the railroad cars containing the fertilizer.

Labeling Requirements: In addition to statements as to weight, brand, and maker, labels must show the guaranteed analysis stating the minimum percentages by weight of soluble potash, nitrogen, and available phosphoric acid.

In the case of bone, rock phosphate, basic slag, and other materials of low available phosphorus, the total phophoric acid must be guaranteed.

If it is desired to guarantee the contents of other elements having value as plant food, the minimum percentage by

weight of each element must be stated in the elemental form.

Mississippi[18]

Scope: The law applies to commercial fertilizers, but the term is not defined.

Registration Fees: An annual registration fee of $5.00 per brand is required. The fee must be paid on or before January 1.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 20¢ per ton. Inspection fee stamps must be used unless a permit has been obtained to allow tonnage reports. If the latter device is used, reports and inspection fees are due and payable quarterly in April, July, October, and January.

Labeling Requirements: Tags are required. Tags must show, in addition to the usual statements as to weight, brand, and maker, the minimum percentages, in whole numbers only, of available phosphoric acid, nitrogen, and the source(s) from which derived, and potash. It must also be stated whether the material is acid-forming or non-acid-forming.

In the case of bone meal, phosphate rock and other products wherein the phosphoric acid is not readily available, the total phosphoric acid may be claimed, but in each case the tag must contain the further statement that the product is not a substitute for superphosphate nor designed to be used as such.

Missouri[19]

Scope: The coverage of the law is not defined but the labeling provisions apply to any commercial fertilizer or material to be used as fertilizer, the selling price of which exceeds $5.00 per ton.

Registration Fees: Although registration is required, there are no registration fees.

Tonnage Reports and Fees: Tag fees are required. These vary according to the size of the container. The rate is ½¢ for each tag or label used on packages weighing 10 pounds or less, 1¢ for each tag or label used on packages weighing from 10-50 pounds, 1½¢ on packages weighing from 50-100 pounds, and 3¢ from 100-200 pounds. When fertilizers are shipped in bulk, one tag costing 3¢ for each 200 pounds must be used.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels must show the percentages of nitrogen, available phosphoric acid, and the potash soluble in distilled water.

In the case of undissolved animal bone, the percentage of insoluble phosphoric acid must be shown.

If the composition is expressed in equivalent to ammonia, etc., in addition to the above, it must be unequivocally shown that such terms are used merely as equivalents and not used to represent additional plant food.

North Carolina[20]

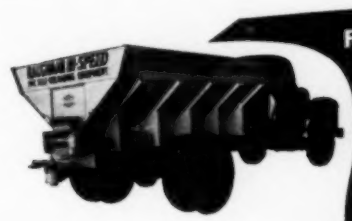
Scope: Under a 1951 amendment, the term "fertilizer material" is defined as any substance containing nitrogen, phosphoric acid, potash, or any other recognized plant food element or compound which is used primarily for its plant food content or for compounding mixed fertilizers. Not included in the definition are all types of animal and vegetable manures.

Registration Fees: The annual registration fee is $2.00 per brand. The fee must be paid on or before July 1.

Tonnage Reports and Fees: In addition, an inspection fee is imposed at the rate of 25¢ per ton or 1¢ for each individual package containing 50 pounds or less. However, in the case of individual packages of 5 pounds or less, a "registration" fee of $25.00 is required annually in lieu of the inspection fee. Inspection tags or stamps must be used unless a permit has been obtained to allow tonnage reports. If the latter device is used, reports and inspection fees are due and payable on the tenth of each month.

Labeling Requirements: In addition to the statement as to name, brand, and maker, labels must show the guaranteed analysis. Different forms of guarantees are required on brands of mixed fertilizers intended for general crops and on brands intended for tobacco.

In the case of mixed fertilizers which are not branded for tobacco, the guarantee must show the minimum percentages of total nitrogen, (optional) water insoluble nitrogen, available phosphoric



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acid, and the soluble or available potash. In addition, it must be shown whether the fertilizer is acid-forming or non-acid forming, and the potential basicity or acidity expressed as equivalent of calcium carbonates in multiples of 5%, or 100 pounds per ton, only.

In the case of mixed fertilizers branded for tobacco, the guarantee must show the minimum percentages of total nitrogen, (optional) nitrogen in the form of nitrate, (optional for plant bed fertilizer) water insoluble nitrogen, available phosphoric acid, soluble or available potash, the maximum percentage of chlorine, and the total magnesium oxide. All fertilizer branded for tobacco must contain magnesium equivalent to a minimum of 2% magnesium oxide for field fertilizer and 1% magnesium oxide for plant bed fertilizer. In addition, it must be shown whether the fertilizer is acid-forming or non-acid forming, and the potential basicity or acidity expressed as equivalent of calcium carbonate in multiples of 5%, or 100 pounds per ton only.

There are special label requirements for "manipulated manures" and "fertilizing materials," if claimed.

In no case, except in the case of unacidulated mineral phosphates and/or basic slag unmixed with other materials, may both the terms total phosphoric acid and available phosphoric acid be used in the same statement of analysis.

Magnesium or magnesium oxide, calcium or calcium oxide, and sulphur may be claimed as secondary plant foods in all mixed fertilizer, but when one or more of these is so claimed the minimum percentage of total magnesium or total magnesium oxide, total calcium or total calcium oxide and total sulphur, as applicable, must be guaranteed. The sulphur guarantee for fertilizer branded for tobacco must be both the maximum and minimum percentages.

Borax may be claimed as an ingredient of mixed fertilizers. If claimed, it must be guaranteed in terms of pounds of borax per 100 pounds of fertilizer and increments of ¼, ½, and multiples of ½ lb. per 100 lbs. of fertilizer.

Additional plant food elements may be guaranteed only by permission.

Oklahoma[21]

Scope: The law applies to all substances containing nitrogen, potash or phosphoric acid sold for manurial purposes, except the dung of domestic animals.

Registration Fees: A registration fee of $10.00 for each brand is required. The fee must be paid before sale.

Tonnage Reports and Fees: An inspection fee is imposed at the rate of 35¢ per ton. The fee is based on quarterly tonnage reports made in January, April, July, and October of each year.

Labeling Requirements: Every lot or parcel of fertilizer sold must be tagged with a statement showing the minimum percentages of nitrogen in available form, potash soluble in distilled water, available and total phosphoric acid, and the maximum percentage of borax. In addition, the maximum percentage of all harmful ingredients must be shown.

South Carolina[22]

Scope: The law applies to any material substance or mixture which contains or is claimed to contain more than 1% of nitrogen, or of total phosphoric acid, or of potash. Lime, limestone, marl, unground bones, stock-pen manure, and barnyard manure or the excrement of any domestic animals are exempt, if not dried, manipulated or otherwise treated, or if not claimed to have a value of more than $4.00 per ton.

Registration Fees: The registration fee is $1.00 per brand, expiring annually on December 31.

Tonnage Reports and Fees: In addition, an inspection tax is imposed at the rate of 2½¢ per ton or 1¢ per individual package containing 50 pounds or less. The tax is based on semi-annual tonnage reports covering the periods of January 1 to June 30 and July 1 to December 31.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels must show the chemical analysis. The analysis must state, in the case of mixed fertilizers, the percentages of available nitrogen, water soluble and insoluble available nitrogen, available phosphoric acid, available potash, whether acid-forming or non-acid-forming, and the

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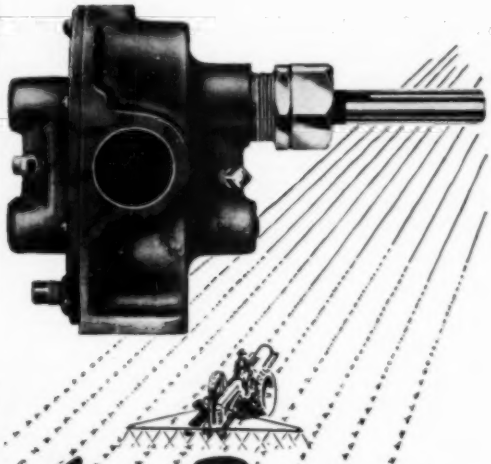

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minimum potential basicity expressed as equivalent of calcium carbonate in multiples of 5%, or 100 lbs. per ton, only.

In mixed fertilizer branded for tobacco, the maximum percentage of chlorine content must also be shown.

In fertilizer materials, the percentages of available nitrogen, available phosphoric acid, and available potash must be shown.

The sources from which nitrogen, phosphoric acid, and potash and potential basicity, if claimed, are derived must be stated in addition to the foregoing. Other ingredients specified in the law may also be included.

In the case of bone, tankage or other organic material in which phosphoric acid is not shown by laboratory methods to be available but eventually becomes available in the soil, phoshoric acid may be guaranteed as total phosphoric acid. The natural unacidulated mineral phosphoric materials must be guaranteed as to both available and total phosphoric acid. In the case of basic slag either the total or available phosphoric acid must be guaranteed.

In addition to the foregoing, it is further required that the amount and analysis of each material or source of each plant food, used in the manufacture of a fertilizer containing two or more plant food elements, be stated in pounds per 100 pounds of mixture on the reverse side of the guaranteed analysis tag or on a separate tag attached to each bag or container.

Tennessee [23]

Scope: The law applies to commercial fertilizers, but does not define the term.

Registration Fees: Although registration is required, there are no registration fees.

Tonnage Reports and Fees: An inspection fee is imposed at the rate of 50¢ per ton. In lieu of tax tags, registrants may apply for a permit to report tonnage and pay the fee based on these reports. Tonnage reports and fees are due and payable on the tenth of each month. Shipment notices are also required.

Labeling Requirements: The guaranteed analysis must show the minimum percentages of available phosphoric acid, nitrogen, potash, magnesium, copper, boron, and manganese. If a filler is used, this fact together with the name of the material of which the filler is composed and the maximum percentage of the filler must be stated. These are the only items to be branded on the package in addition to the usual statement as to weight, brand, and maker.

In the case of bone meal, tankage, or other animal or vegetable products where the phosphoric acid is not available to laboratory methods but becomes available on the decomposition of the product in the soil, the phosphoric acid must be claimed as total phosphoric acid, unless it is desired to claim available phosphoric acid also, in which latter case the guarantee must take the form above set forth, for other products. In the case of bone meal and tankage, manufacturers may brand information on the bags showing the fineness of the product, provided it takes a form approved by the Commissioner of Agriculture.

Texas [24]

Scope: Under a 1951 amendment, commercial fertilizers are defined to include any substance which contains or is claimed to contain more than 1% of total phosphoric acid, potash, or nitrogen, and which is used for application to the soil to promote the growth of crops, or any substance which is claimed to exert a beneficial action upon the soil or to promote the growth of crops. Lime, limestone, marl, agricultural gypsum, unground bones, stockpen manure, barnyard manure, or the excrement of any domestic animal are exempt if they have not been dried or manipulated or not claimed to have a value of more than $4.00 per ton.

Registration Fees: Although registration is required, there are no registration fees.

Tonnage Reports and Fees: An inspection fee is imposed at the rate of 25¢ per ton. The fee is based on quarterly tonnage reports required to be submitted in December, March, June and September.

Labeling Requirements: In addition to the statement as to weight, brand, and maker, labels must show the minimum percentages of available phosphoric acid, nitrogen, and potash soluble in distilled water. Only such potash may be claimed to be

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present as sulphate, which is in excess of the quantity required to combine with the chlorine present, less ½%.

In bone meal, tankage, or other similar products, the phosphoric acid must be claimed as total phosphoric acid, unless it is desired to claim available phosphoric acid only in which latter case the guarantee must take the form above set forth for other products. In the case of bone meal and tankage, information showing the fineness of the product may be stated if it takes a form approved by the State Chemist.

Footnotes

1. Conn. Gen. Stat. 1949, c. 319
2. Me. Rev. Stat. 1944, c. 27, as amended by P.L. 1949, c. 343, as amended by P.L. 1949, c. 378. See, Libby v Woodman Potato Co., 195 Atl. 569 (Me., 1937) (fertilizer not containing the specific ratio of chemical ingredients shown on the bag, held adulterated under the law, entitling buyer to recover in action for breach of contract the money value of his loss resulting from its use)
3. Mass. Ann. Laws 1944, c. 94 secs. 250 et seq.
4. N. H. Rev. Laws 1942, c. 228
5. R. I. Gen Laws 1938, c. 208
6. Vt. Stats. Rev. 1947, c. 338
7. Del. Rev. Code 1935, c. 22, as amended in Vol. 29, c. 48, as amended in Vol. 35, c. 49
8. Md. Code 1939, 1943 Supp., Art. 61
9. N. J. Stat. Ann., secs. 4:9-1 et seq., as amended by P. L. 1949, c. 203
10. N. Y. Agriculture and Markets Law, Art. 10, as amended by P.L. 1941, c. 551. See, National Stonemeal Co. v Wilson, 164 N.Y.S. 908 (1917) aff'd 168 N.Y.S. 241 (1917) (interpreting the registration provisions)
11. Purdon's Pa. Stat. Ann. 1941, Tit. 3, secs. 81 et seq.
12. W. Va. Code 1949, secs. 2068 et seq.
13. Okla. Code 1940, Title 2, secs. 282 et seq., as amended by P.L. 1951
14. Ark. Stat. 1951, Act No. 106
15. Fla. Stat. 1949., c. 576
16. Ga. Code Ann. 1947 Supp., secs. 5-1001 et seq., as amended by P.L. 1951, Act No. 460. See also, id. secs. 5-1301 - 5-1304 (relating to cottonseed meal), id. secs. 5-1401 - 5-1404 (relating to bulk sales of fertilizer).
17. La. Rev. Stat. 1930, secs. 1311 et seq. See also, the Anhydrous Ammonia Fertilizer and Equipment Law, P.L. 1948, Ex. Sess. No. 15, as amended by P.L. 1950
18. Miss. Code 1942, 1950 Supp., secs. 4450 et seq.
19. Mo. Rev. Stat. Ann. 1943, secs. 14251 et seq.
20. N.C. Gen. Stat. 1943, c. 106, as amended by P.L. 1947, c. 1986, as amended by P.L. 1951. A provision enacted in 1951 declares it to be in the public interest that a referendum be held among farmers, producers, and growers of agricultural commodities for the purpose of levying upon themselves an assessment of 5c per ton on mixed fertilizer, commercial feed, and their ingredients (except lime and land plaster) to provide funds through the Agricultural Foundation to promote research in all phases of agriculture.
21. Okla. Stat. Ann. 1951, Tit. 2, secs. 460 et seq.
22. S.C. Code 1942, secs. 6353 et seq.
23. Williams' Tenn. Code 1934, secs. 500 et seq., as amended by P.L. 1947, c. 56. See also, the Anhydrous Ammonia Storage and Equipment Act, P. L. 1949, c. 198
24. Vernon's Tex. Civ. Stat. 1942, Arts. 94 et seq., as amended by P.L. 1949, c. 170, as amended by P.L. 1951

Part II of this article will be published next issue.

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Pesticide Analyses Out

Analyses of insecticides, fungicides, herbicides, and materials designed to control household pests offered for sale in New York State in 1950 are reported in a bulletin now available upon request from the Experiment Station at Geneva.

PESTICIDE RESEARCH

(*Continued from page 34*)

fruits, cured meats, and cheeses, are highly susceptible to infestation by insects, and heavy losses are likely to occur unless adequate protection is given them. The infestation may start in the field during the growing period, in processing plants, during shipment or in storage.

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In recent years outstanding results have been obtained in controlling weeds and undesirable woody shrubs and trees. This has made practicable the tremendous increase in grazing lands for greater production of livestock. Chemical control of weeds may be achieved at much lower costs than by cultivation and in wheat, rice, and many other field crops it is the only practicable method of weed repression. These developments have greatly reduced the amount of farm labor required at a time when manpower is an important factor.

Without going any further, it can be concluded that billions of dollars and millions of tons of food and feed are saved each year through the proper use of pesticides. But, we must not overlook the fact that losses by various insect pests in the United States are still estimated to be four billion dollars annually . . . and that is a real challenge to us.

To meet this challenge the chemical industry alone this year will spend millions of dollars on research projects in the development of new pesticides. However, if unreasonable restrictions are placed upon the use of pesticides required for food production, it will necessarily stifle research and the development of new and improved materials. Research must be directed into fields where there is some chance of bringing a product into commercial production within a reasonable length of time.

It is certainly unfortunate that there has been an attempt on the part of certain groups to impute a sinister meaning to the use of chemicals in protecting food, clothing, and the other necessities of life. Such groups fail entirely to recognize the honest competitive function which modern research plays in the development of new uses for chemicals.

The chemical industry today spends a vast sum for research. The total can hardly be approximated since not all companies report their research expenditures. We do know, however, that the leading companies in the strictly chemical field spend an average of about 3 per cent of their total sales dollar and the pharmaceuticals will run as high as 7 to 10 per cent. The total sum certainly runs in many, many millions of dollars. As an example, my own company—Commercial Solvents, is spending more than 2 million dollars a year on research. Research expenditures of other companies in the industry range from well below this figure to the 38 million dollars spent by duPont in 1950.

A substantial percentage of such large sums is spent for research in agricultural chemicals, including pesticides for application in the food growing, and food processing branches of the business. In addition, governmental and educational sources contribute many millions more to research efforts in these fields.

Could any one think that these vast sums are being used to develop products which will fool the public and injure the ultimate consumer?

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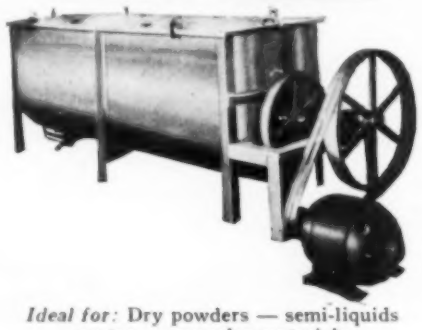

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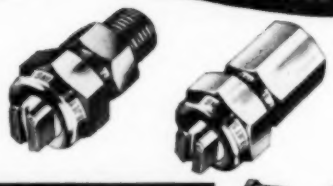

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Far from this, the chemical industry is acutely aware of its responsibility as a guardian of the public health. I referred before to the "honest competitive function" which research plays, and it is worth while to elaborate a little on this point.

New products are developed by private enterprise for profit, and in the world of free enterprise this is the fundamental reason for the tremendous research and development expenditures mentioned.

But if any chemical concern attempted to put out a product which was detrimental to the public health, its competitors would quickly and happily make that fact known. Free enterprise and the profit motive, in fact, act as powerful influences against the reckless introduction of new products.

Today we have vastly improved weapons at our command and we are upon the threshold of still greater advances in insecticidal technology. To relax our research and development or to be hampered by more restrictive regulations and controls will halt the progress we are making.★★

SURFACE AGENTS

(*Continued from page 37*)

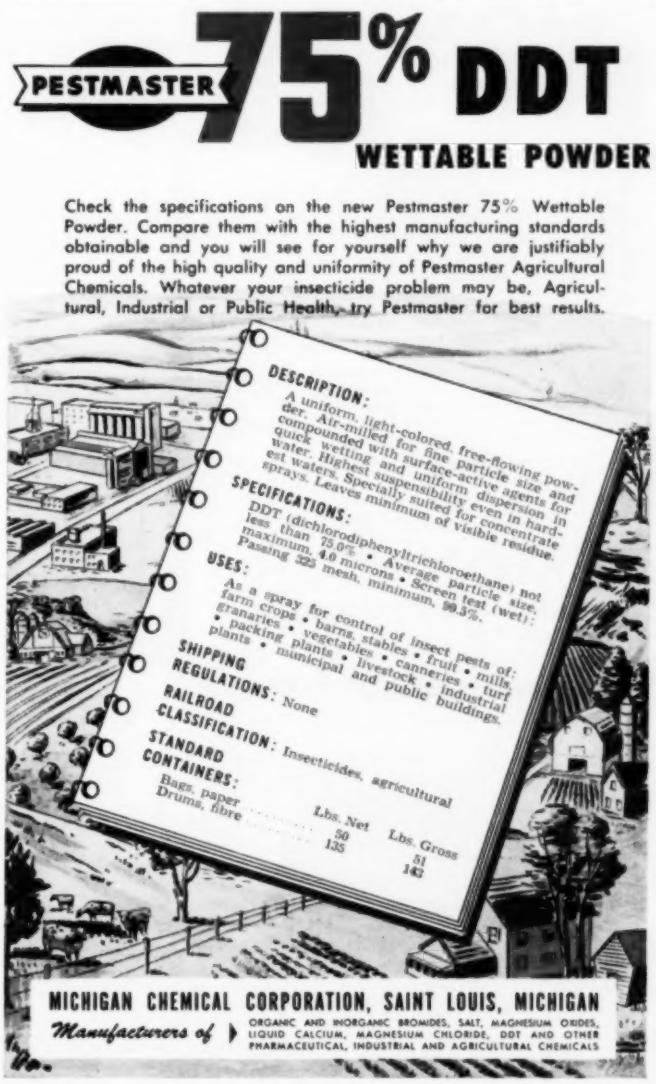
a water miscibility index of over 50. The formation of oil-in-water emulsions can be expected on dilution with water of emulsifiable formulations containing an agent having such properties. Since these agents are only partly miscible with the oils, a mutual solvent is required for complete miscibility. Often the mutual solvent is not surface active and at the concentrations used may have little or no effect on the properties of the emulsions.

A blend of an agent with high oil-miscibility index with another that has a high water-miscibility index, may be completely miscible with an oil. For example, some blends of "Triton B-1956" and "Igepal 300" have this property and may be useful in formulations containing certain mineral oils. The use of blends of this nature may eliminate the need for a mutual solvent that is not surface active.

Standardization of Emulsifiable Formulations

AFTER a satisfactory emulsifiable formulation has been prepared, the oil and water-miscibility indexes of the surface-active agent may be established as standards with reference to three-component systems as described previously. The indexes of other batches of the agents may be compared with such standards.

The oil-and-water miscibility indexes of different batches of a commercial surface-active agent may be variable. For example, one batch of an agent was found to have a white mineral oil miscibility index of 5.0, but another was not miscible with this oil on addition of 50 grams of oleic acid. One batch of another agent had a xylene miscibility index twice that of a second batch. With most agents,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SPECIFICATIONS:
DDT (dichlorodiphenyltrichloroethane) not less than 75.0% • Average particle size, maximum 4.0 microns • Screen test (wet): Passing 325 mesh, minimum 99.3%.
USES:
As a spray for control of insect pests of: farm crops • barns, stables • fruit • mills, granaries • vegetables • canneries • turf • packing plants • livestock • industrial plants • municipal and public buildings.
SHIPPING REGULATIONS: None
RAILROAD CLASSIFICATION: Insecticides, agricultural
STANDARD CONTAINERS:
Lbs. Net Lbs. Gross
Bags, paper 50 51
Drums, fibre 135 143
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the miscibility indexes of different batches were in close agreement. Whether such variations were due to lack of uniformity of raw materials, or of plant practice, to changes in composition without change in product name, or to decomposition during shortage, is not known. In any case changes in the formula may be required to make the product uniform. Often changes are made most easily when two or more surface-active agents having different miscibility indexes are used in the formulation. The miscibility indexes of the agents and of a mixture of the agents in the proportions used in a formulation are thus established as standards. The miscibility indexes of similar mixtures of other batches of the agents may be adjusted to such standards by making changes in the proportions of the agents.

Some surface active agents tend to layer during storage at low temperatures. The oil-and-water miscibility indexes of the layers may not then be in agreement with those of the agent in a homogeneous condition. It is essential that before use, the agent be stirred and warmed, if necessary, until it is uniform. A sample of the agent to be used in each batch of a formulation may be tested to determine whether its miscibility indexes are in agreement with those of the standard.

BOOK REVIEWS

(*Continued from page 61*)

use of chemicals in agriculture, possibility an important influence in the later development of the company's business in this field. His own orchards were his original agricultural "guinea pigs."

For those interested in the American chemical industry, this book makes excellent reading. It is a projected picture of a man in a chemical business preceding and during the greatest period of development in the history of the American chemical industry. That many skeptics did not share Herbert Dow's faith in chemical manufacture did not make him quit. To those who shared his faith, it paid off handsomely.

AMMONIA SOLUTIONS

(*Continued from page 47*)

The ammonium nitrate types of solutions, due to their lower vapor pressures, are usually shipped in 10,000 gallon welded steel tankcars although several manufacturers are gradually changing over to aluminum tankcars to combat corrosion. Most of these cars are equipped with either lead or aluminum rupture discs rather than spring-loaded valves, but in either case the receiving plant should check the rupture disc pressure before unloading, in order that they will not apply too high an air pressure in transferring.

The urea solutions are shipped in two types of tankcars, some being high pressure cars with relief valves set at 225 psig while others are low pressure cars with 75 psig relief

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Statement of the ownership, management, and circulation required by the Act of Congress of August 24, 1912, as amended by the acts of March 2, 1933, and July 2, 1946 (Title 39, United States Code, Section 233) of Agricultural Chemicals, published monthly at Baltimore, Md., for October 1, 1951.

1. The name and address of the publisher, editor, managing editor, and business managers are: Publisher, Industry Publications, Inc.,254 W. 31st St., New York, 1, N. Y., Editor, Lawrence A. Long, 254 W. 31st St., New York, 1, N. Y.; Managing Editor, Wayne E. Dorland, 254 W. 31st St., New York, 1, N. Y.; Business Manager, Thomas Morgan, 254 W. 31st St., New York, 1, N. Y.

2. The owner is: (If owned by a corporation; its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address, as well as that of each individual member, must be given.

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5. The average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the 12 months preceding the date shown above was: (This information is required from daily, weekly, semiweekly, and triweekly newspapers only.)

Signed IRA P. MACNAIR, Publisher

Sworn to and subscribed before me this 26th day of September, 1951.

HARRIET LEVINE

(seal) (My commission expires March 30, 1952.)

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NEW CLOSING DATE

Due to printing complications, the advertising copy closing date of AGRICULTURAL CHEMICALS has been advanced to the

15th of Month Preceding Publication

valves. Relief valves on these cars are of the spring-loaded type, automatically re-seating. Before applying air pressure to unload, the operator should check the relief valve pressure which is stencilled both on the end of the car and on the relief valve.

Storage tanks for ammonium nitrate solution should be fabricated of welded steel or preferably aluminum with a working pressure of at least 65 psig. Storage tanks for urea solutions should be designed for a 75 psig working pressure and a hydrostatic test pressure of 150 psig. Storage tanks should be protected from freezing to prevent crystallization of solids, and from direct rays of the sun in summer to keep vapor pressures low. All tanks should be equipped with necessary relief valves. Before installing any storage tank, a review of applicable state laws should be made to insure compliance.

Piping, fittings and valves for all types of solution should be, in order of preference, stainless steel, aluminum, or black iron. Diaphragm valves are best, with lubricated plug-cock valves as second choice. All valves piping and fittings should be specified for ammonia service. Measuring or weighing tanks should be of all-welded stainless steel or aluminum construction, equipped with pressure relief valves with free vents to the outside asmosphere. No copper, brass, bronze or simliar alloy should be used anywhere in the system.

All of the producers of fertilizer ammoniating solutions maintain service departments to assist customers in the proper installation of equipment and in methods of handling their product, so it would be well for any user to take advantage of this service when contemplating making new installations or modifying old ones.

There are entirely too many accidents resulting from working on and around tankcars and unloading racks. This refers to the purely physical-type accident resulting from falls, slipping, etc. Most accidents of this type, as far as handling ammonia is concerned, result from improperly designed or poorly maintained unloading racks, improper tools, and shoddy shoes and clothing. The unloading rack should be sturdily constructed, having regulation railroad clearance, secure stairs with handrails, and a hinged bridge also with handrails, so that the worker has safe, sure access to the car dome. A locker can usually be conveniently built under the rack in which should be kept the proper tools for connecting lines and the required safety equipment. A safety shower should be close by.

Since 15 to 20% concentrations of ammonia gas are flammable, no arc or acetylene cutting or welding should be performed on ammonia tanks or lines until they have been thoroughly purged.

There is no reason why ammonia or the ammonia solutions cannot be handled safely, providing these cardinal rules for the handling of any hazardous liquid are observed.

•

Shell Builds Sulfur Plant

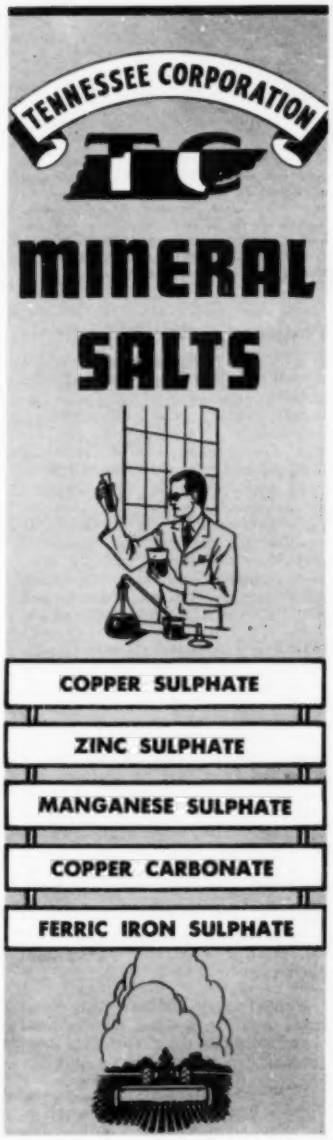
Shell Chemical Corporation will add to its Houston operations a unit for recovering sulfur from waste refinery gases, it has been announced by W. P. Gage, vice-president. Output of the new unit will be sold for conversion to sulfuric acid.

The new sulfur recovery unit, certified by the Government as a necessary defense project, will be constructed by the Ralph M. Parsons Company of Los Angeles. Operation is expected by mid-1952. In the recovery process, waste refinery gases, containing hydrogen, carbon dioxide and a small percentage of light hydrocarbons, will be burned and catalytically converted to sulfur at an annual rate in excess of 13,000 tons.

•

Baird Co. to New Location

J. M. Baird Company has announced a new location in New York City, 254 West 31st St. The company had formerly been located on Nassau street, but has combined both its export and import departments for industrial chemicals in the new quarters.



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Technical Assistant: For reputable national manufacturer of basic insecticide. Degree in entomology or related agricultural sciences to assist in technical phases of agricultural chemicals sales. Prefer experiment station or commercial experience and knowledge of southern agriculture. Location in east central area. Some traveling involved. Reply fully to Z-2, P. O. Box 3414, Phila., 22, Pa.

Wanted - Accountant Manager: Age 30-40. Agricultural chemical knowledge preferable but not mandatory, North Jersey. Write experience, etc to Box 579, c/o **Agricultural Chemicals.**

Wanted: Man familiar with insecticide blending, use and selling—good opportunity near New York City. Give age and experience. Address Box No. 580, c/o **Agricultural Chemicals.**

Sales Executive Or Representative- At present employed but desires new position with manufacturer of agricultural chemicals. Successful sales record and experience in marketing basic fungicides, herbicides and insecticides in Eastern states. Knows formulators and others in trade - as well as personnel of experiment stations. Especially successful in introducing and developing new products. Graduate Chemist. Married. For further details write Box 585, c/o AGRICULTURAL CHEMICALS.

Entomologist, B.S., M.A. — Ambitious young man. Brigham Young University graduate. Extremely high grades. Thorough background entomology. Covered taxonomy, morphology and beneficial and injurious insects. Minored in botany, accentuating plant pathology. Majored biology and chemistry. Married. Address Box 581, c/o **Agricultural Chemicals.**

Sales Executive, 45. Experienced in both heavy chemical industries and broad range of agricultural chemicals with full responsibility for sales and related functions, including production and research. Chemical degree. Address Box No. 582, c/o **Agricultural Chemicals.**

Research or Technical Director— Agricultural Chemicals. Fifteen years experience, mostly in industry, developing and testing insecticides, weed killers etc. on all major crops. Extensive contacts throughout U. S., in state and federal agencies, research and agricultural organizations and others. Familiar with manufacturing problems. Available at early date. Address Box No. 583, c/o **Agricultural Chemicals.**

Entomologist. Ph. D., with extensive experience on development and application of insecticides and related chemicals to large variety of agricultural and other pest control problems, including weed, plant disease and mosquito control. Wide acquaintance in experiment stations and industry. Interested in either research or technical service work. Address Box No. 584, c/o **Agricultural Chemicals.**

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Chemical Engineer and Chemist

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Advises Cotton Spray

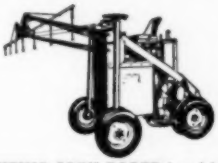
South Carolina Agricultural Experiment Station, Clemson, S. C., is informing farmers that the use of spray materials on their cotton fields will give control of boll weevil equal to or better than dusting. Yields are about the same for both methods.

This information is based on careful comparison tests in 1-acre plots in several fields, so that results would be directly comparable. The study was launched to answer questions from farmers, ginners and manufacturers as to whether spraying or dusting is cheaper and more effective.

Spray materials for cotton insect control have been available for only about one year, a note in the station's annual report for 1950 observes.

FARMERS GROW BETTER CROPS AT LESS COST *with*

John BEAN SPRAYERS



ROUTING CORN BORER is a job for the John Bean self-propelled HI-LO sprayer. Clearances up to 6 feet permit use in tall corn to get after second brood borer. Boom height is adjusted by driver while spraying. When you sell the Hi-Lo you offer the most efficient corn sprayer there is.

LIVESTOCK PARASITES are quickly controlled with a John Bean high pressure sprayer. The spray gets down through matted hair to the hide where it gives better, longer-lasting protection. Increased meat and milk production make ownership of a John Bean sprayer a "must".

AUTOMATIC ORCHARD SPRAYING with one of the three types of John Bean sprayers saves labor, saves time, and permits one man to thoroughly cover up to 75 acres a day. Fruit growers in your area want John Bean equipment to get better fruit at less cost.

WEED CONTROL is fast and effective with a low-cost John Bean tractor-mounted sprayer and boom. Pump mounts quickly on tractor power-take-off so there is no interference with other farm operations. The Bean tractor mounted sprayer presents a real sales opportunity for you.

John Bean dealers have many other sprayers and Farm equipment to help them build sales and profits . . .

Spartan portable sprayer: The Ranger for brush and weed control: All Purpose farm sprayer: Speedsprayer: Automist: Rotomist and more. Write for complete information on the John Bean line.

John BEAN
Lansing 4, Michigan
Dept. AC-11
Division of Food Machinery & Chemical Corp.

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TALE ENDS

AN astute observation on the verbosity of Washingtonian orders was recently published in the *New England Homestead*. Its clever barb seemed to us worthy of reprinting here: "DO YOU KNOW . . ." it started out innocently enough: "That Lincoln's Gettysburg address contained 266 words, the Ten Commandments contain 297 words, the Declaration of Independence contains 300 words, and that the OPS order to reduce the price of cabbage contains 26,911 words?"

We could go on and on commenting on this comparison of use of words, but if we did, someone would be sure to look at the length of this column and say, "Look who's talking."—After all, we don't want to be in the position of the loquacious gentleman about whom a close observer remarked, "He is a sophisticated rhetorician, inebriated in the exuberance of his own verbosity."

•

The possibility of growing corn in northern Ontario, or cotton in New York State at some time in the future, was brought out by Dr. George H. T. Kimble, director of the American Geographical Society before the New York Publicity club recently.

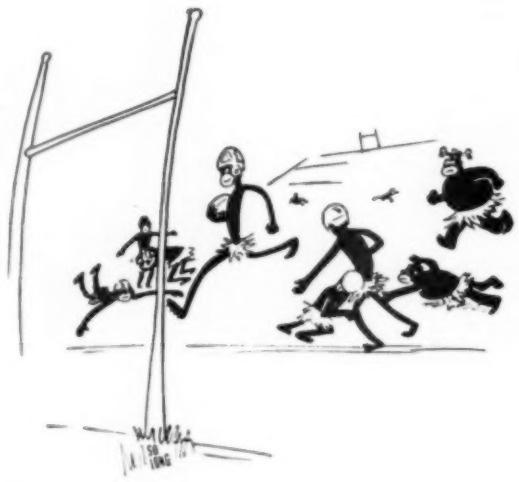
The climate in the North Atlantic region is becoming unmistakably warmer, he declared, with the most noticeable change in Canada. The mean annual temperature of Montreal has risen from 42° F in the 1880's to 46° F in 1950, he points out. Furthermore, along the bleak natural boundary between the Canadian forests and the Arctic, tree growth is moving northward. Saplings of tamarack, spruce and birch are now found in places where these were unknown before.

In eastern Canada, cereals can be grown 100 miles farther north than ever before, due of course, partly to improved varieties and better cultivation methods, but also definitely to a milder climate. No explanation of this warming up has been advanced as yet.

•

The meeting season is here again! Industry people interested in attending these gatherings may as well keep their suitcases packed and their eyes on train and plane schedules; for regardless of whether you're interested in the fertilizer field, the entomological field, in plant pathology, in weed control, or in manufacturing problems in connection, there's a meeting somewhere to give you the information you need.

We'll be at many of these meetings ourselves, camera in hand, eager to meet friends old and new and to report the activities of the various groups involved. Be seeing you!



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Kraft paper supplies are short. So it is important for you to get the best use from your multiwalls. Here is one way to stretch them...

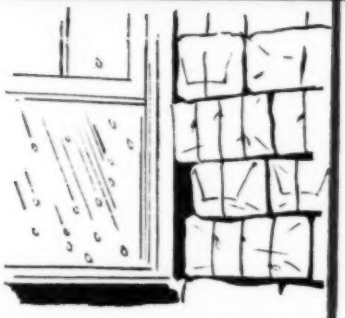
Keep Storage Rooms Humid:

1. Let steam escape in bag storage room to keep air and bags humid. Keep a humidity indicator in the storage room and check it frequently. Always leave aisles or spaces between stacks of bags to allow circulation.

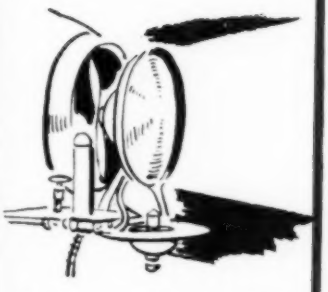
2. Store bags on dunnage, away from floor, and keep floor wet so moisture can be absorbed into air. A relative humidity of about 50% at warm temperature is best.

3. Drill small "needle" holes in horizontal water pipes. Hang cloths over holes. Air absorbs moisture from wet cloths.

4. Hang wet cloths over edge of water barrels. Cloth absorbs water and air absorbs moisture from cloth. Keep barrels well filled.



5. Open windows on damp or rainy day. Damp outside air will circulate in the bag storage room. Multiwalls are strongest when moisture content of the paper is about 6 or 7%.



6. Use commercial humidifying apparatus. Many types of commercial humidifiers are available with capacities to suit individual requirements.

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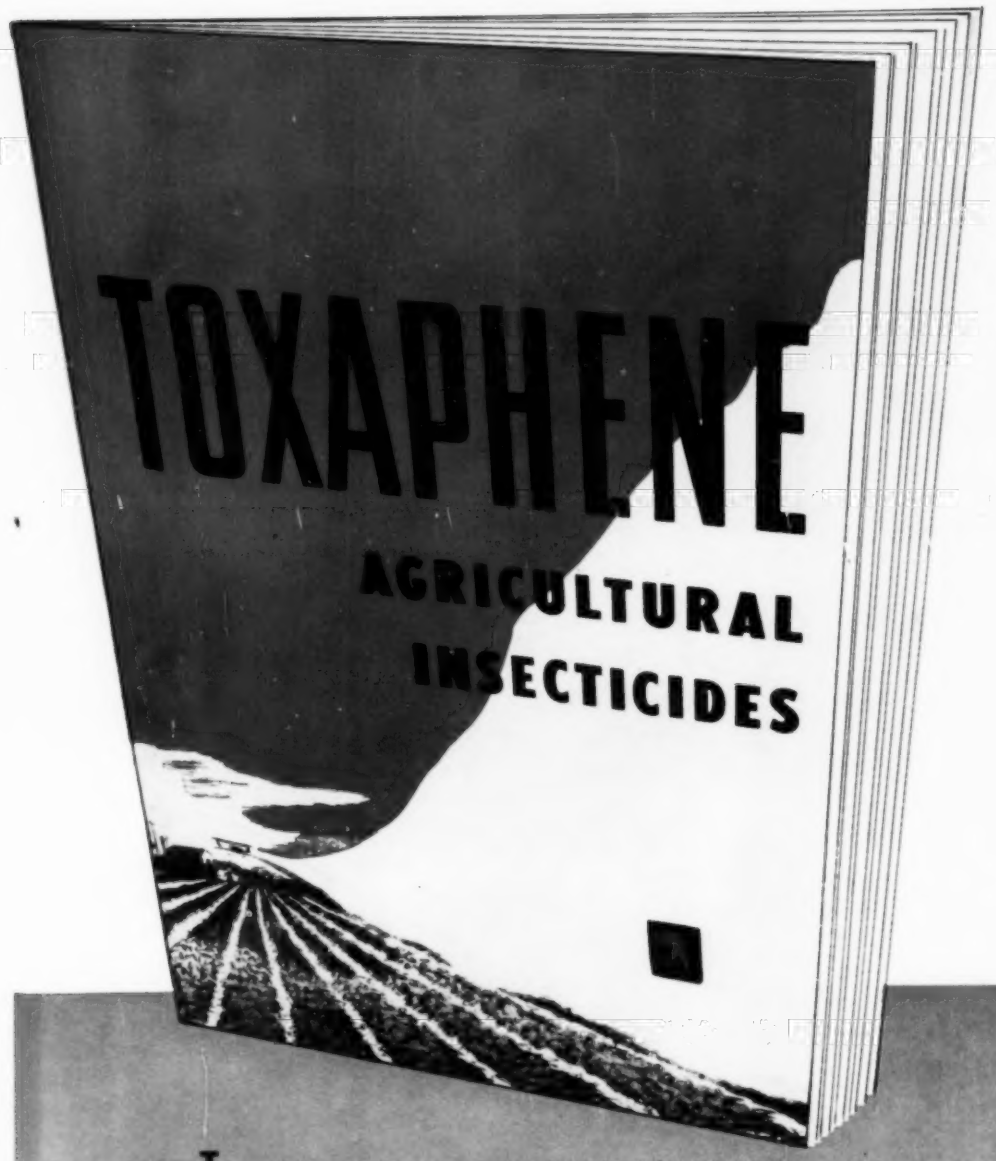

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